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MORTALITY, 1948-1957, AND MORBIDITY, 1957, AMONG PERSONS RESIDING IN DONORA, PENNSYLVANIA DURING SMOG EPISODE OF OCTOBER 1948

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MORTALITY, 1948-1957, AND MORBIDITY, 1957, AMONG PERSONS RESIDING IN DONORA, PENNSYLVANIA DURING THE SMOG EPISODE OF OCTOBER, 1948

Report of a Study Conducted Under Contract No. SA ph 67877
between the Department of Biostatistics,
Graduate School of Public Health,
University of Pittsburgh
and the
Air Pollution Medical Program,
United States Public Health Service

by

Public Health Service
Environmental Health
Reference Room

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INTRODUCTION

In October of 1948, Donora, Pennsylvania was subjected to an acute smog episode. From November 1948 through March 1949 the United States Public Health Service conducted a community survey of the Donora area in order to determine who had been affected by this episode.

The principle objective of our investigation, begun in the Fall of 1956, eight years after the smog episode, was to contrast the subsequent health histories of those persons included in the 1948 community survey who were reported to be affected with those who were reported not to be affected. (A detailed statement of the objectives of the Donora Health Study of 1957 may be found in the prospectus for the study which is appended to this report.)

The plan developed for accomplishing these objectives called for the location, identification, and interviewing of 4092 persons who were residents of the Borough of Donora in October, 1948 and who were included in the United States Public Health Service community survey. In addition, the plan called for selection and interviewing of a one-third sample of all persons resident in the Borough of Donora during the 1957 survey period.

The field work began in mid February and was essentially complete by the end of March, 1957. Health information was obtained for ninety-two per cent and mortality information for ninety-nine per cent of the 1948 sample persons. Ninety-nine per cent of the one-third sample of the 1957 residents of the Borough were interviewed.

ORGANIZATION

The report has been divided into several sections to facilitate the presentation of a large amount of information.

Section I contains a summary of the data relating to the principal objectives of the investigation, conclusions we have drawn from these findings, and our suggestions for further study which would increase our ability to interpret these findings. We have also included in this section some recommendations regarding future study designs for investigations of the possible effects of air pollution.

Section II reports the detailed findings on mortality, morbidity, and environmental factors. This section concludes with some notes on methodological problems involved in a longitudinal study of the type we have done, focussing on (1) the effect of these problems on our findings and (2) suggestions for possible methods of handling them when planning future studies in which a significant time lapse is involved.

Section III contains the basic tabulations from which the summarized tables included in Sections I and II were drawn.

The Appendices include the prospectus, a summary of the steps taken to prepare the community for the survey, and facsimiles of the various research instruments employed in our study: questionnaires, interviewer's manual, punch card codes, etc.

ACKNOWLEDGMENTS

It is a pleasure to acknowledge the assistance and cooperation of the many individuals and organizations involved in this investigation. Appreciation is expressed to the people of Donora for their willing participation; to the officials and members of the many civic, educational, labor, religious, professional and fraternal organizations who so wholeheartedly supported our work; to the Editor of the Donora Herald American and management of radio station WESA; to the management of the American Steel and Wire Company; and to the Charleroi Monessen Hospital, the Donora Registrar and the Pennsylvania Department of Health who made available the various records on which portions of this report are based.

Special thanks are due to all the persons who helped to collect, process, analyze and report the data of this investigation. The advice and criticism of Dr. Harry Hiemann, Dr. Richard Prindle and Mr. Nicholas Manos, Air Pollution Medical Program, United States Public Health Service have been of great value. Among the members of the survey staff the able work of Miss Dorothy Perrott, Mrs. Ida Sissman, and Mrs. Martha Wieland is gratefully acknowledged. Mr. Arthur LeGasse supervised the tabulation and computations and Miss Mary Diulus typed the report. Finally, Judith M. Hiemann's revisions and general editorial assistance on an initial draft of this report are appreciated.

Section I

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

A. Summary of Findings

The material that is included in this section will show that the group of persons who complained of being ill - "affected" in the U. S. Public Health Service Report - during the October, 1948 smog episode in Donora have had a subsequent morbidity and mortality history that is clearly distinguishable from that experienced by those persons "not affected" during the episode.

The major differences between these two groups can be summarized from our data as follows:

1. Mortality
   a. The age adjusted* eight and one half year mortality rate is higher for the affected group. Moreover, the mortality rate of the affected group increases with the severity of affection reported in the 1948 survey.
   b. Cause of death differences between the two groups are somewhat obscured because of the small frequencies of deaths from a single cause. However, for the largest single cause of death, arteriosclerotic heart disease, the "affected" males have an age-adjusted rate more than twice that of the "not affected" males. Again, the difference between the rates for the affected and not affected males increases with the severity of affection.

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*Since the "affected" group has an average age considerably older than the "not affected" group, age-specific comparisons between the two groups are of more significance than comparisons of total morbidity, mortality, incidence of selected diseases, etc.

c. Differences in the mortality experience of the two groups appear within a year following the episode and the differences increase steadily with time until the year 1954 when they appear to stabilize.

d. A higher mortality rate for those in the affected group is generally, although not uniformly, consistent for all ages and both sexes.

e. Mortality among persons affected by the episode who gave no history of prior chronic illness is, in general, only slightly higher than mortality in the not affected group.

f. Persons reporting a history of heart disease, asthma, pneumonia or bronchitis prior to the episode who were 50 years of age or older in 1948 show no difference in subsequent mortality when classified by reaction to the smog. In the age group 21-50, however, affected persons of both sexes have substantially higher subsequent mortality rates than not affected persons of this type.

2. Morbidity

The survivors of the "affected" group, when compared to the survivors of the "not affected" group (a) have a higher frequency of current illness and symptoms, (b) have a higher prevalence of chronic illness, (c) have a higher prevalence of cardio-vascular and respiratory illness and hospitalization, including a higher prevalence of reported heart disease, asthma and bronchitis, (d) have both higher (1957) prevalence and (1948-57) incidence of heart disease. These differences in morbidity are reflected in each age and sex class with few exceptions. It is significant to note that even the group under twenty years old in 1948 reflects this general pattern.

In addition to the comparisons of the "affected" and "not affected" groups, the total 1948 USPHS group has been compared with other nearby communities for which we have appropriate data. These comparisons show that the subsequent sickness and mortality experiences of the 1948 group over the past eight and one-half years differ little from the groups available for comparison. Total mortality in Donora since 1948 agrees closely with the experience of the entire United States (See Tables 6 and 7). Rates of mortality for specific causes among the 1948 study group are very similar to those experienced in the State of Pennsylvania during the same period of time. Comparison of morbidity findings for the 1948 study group for the 1/3 sample of 1957 Donora residents and for two neighboring communities indicate a close agreement of the prevalence of reported diseases.

B. Conclusions

The essential finding of this investigation is that persons who were reported ill in 1948 at the time of the smog episode have demonstrated subsequently higher mortality and prevalence of illness than the other persons living in the community at that time. Furthermore, persons who complained of more severe illness in 1948 demonstrate greater subsequent morbidity and mortality than persons with mild complaints. This greater morbidity and mortality is apparently related to the cardio-respiratory system.

In terms of the study of air pollution and its relationship to health and disease, these findings raise three central questions:

(1) To what extent is the subsequent health experience of those persons who became ill during the episode related to complaints first arising during the episode or to complaints present before the episode?

(2) To what extent is the greater morbidity and mortality a direct consequence of (a) a short term massive exposure to air

pollutants (b) a continued exposure both prior and subsequent to the episode (c) a combination of (a) and (b)?

(3) To what extent are the manifestations of sickness specifically related to the particular pollutants in the Donora air?

In discussing the first question it should be mentioned that the 1949 analysis by the USPHS indicated that those persons reporting a history of cardio-respiratory conditions prior to October, 1948 had a higher rate of illness during the episode than persons of the same age and sex not reporting prior cardio-respiratory illness. Our data show, however, that even the persons who denied a history of heart disease, asthma or chronic bronchitis prior to October, 1948, but were affected during the episode, have had a higher subsequent morbidity rate than persons of the same age and sex who were not affected during the episode. Taking these findings at face value, it would seem that subsequent health experience is to a great extent related to the complaints first arising during the 1948 smog episode. The basic assumption in this inference is that the persons who denied a history of cardio-respiratory conditions actually did not have them, and conversely, that those who reported them did. Our experience in other surveys indicates that there is considerable under-reporting of impairments in interview surveys. (Tauber, J., and Thompson, D. J. "The Prevalence of Diseases of the Heart in an Urban Center as Estimated from Medical Examination of a Probability Sample", _Journal of Chronic Disease_, Vol. 6, No. 6, pp. 595-605, December, 1957, and Thompson, D. J., and Tauber, J. "Household Survey, Individual Interview, and Clinical Examination to Determine Prevalence of Heart Disease", _American Journal of Public Health_, Vol. 47, No. 9, September, 1957.) If any significant amount of such understating of previous illness did exist in the survey of 1948, the meaning of the findings would be that the discomforts of the smog episode served only to bring out or emphasize already existing impairments.

With respect to the second question our analysis has proceeded along the lines of comparing the length of Donora residence together with the illness history prior to 1948 to the subsequent mortality and morbidity experience. From this analysis we had hoped to obtain an indication of the relative significance of the acute episode and the chronic exposure over the years. However, no clear relationship between illness and residence history has been established.

Among persons reporting a history of prior cardio-respiratory illness, those between the ages 21-50 show a differential subsequent mortality depending upon their reaction to the smog episode. This finding is pertinent to both our first and second questions. In relation to question 1, the differential mortality in the age group 21-50, if real, would indicate that the reaction to the smog episode played a role even among those whose impairment ante-dated the episode. This role may have been one of aggravating the existing cardio-respiratory condition or simply one of labelling those cases which were the more severe or disabling. The failure to find a mortality difference in the age group 50 and older between the group who became ill during the episode and those who didn't, again if real, is disturbing. If either the "labelling" or the "aggravating" hypothesis is correct we would have expected to find a mortality differential in this age group. That we didn't find the differential may be a chance occurence, or may be that our time period is long enough to give competetive causes of death a chance to operate and thus obscure the picture.

In regard to the third question, although the data from Donora included in this report point to some effects on the cardio-respiratory system, they do not provide the means for relating particular pollutants to specific symptoms. Without such specific information it is difficult, if not impossible, to distinguish between persons whose disease conditions conceivably could be due to exposure to air pollution from persons whose disease conditions are due to other factors. Therefore, although we know that an answer to this question is vital for the understanding of not only the Donora episode, but also of the relationship of air pollution to health in general, we find no way in which the analysis of the data now in our possession can provide an answer.

C. Recommendations

As indicated in the preceding paragraphs additional analyses of the data which have already been collected are now in progress. These analyses have been undertaken to determine whether it is possible to gain from these data (1) suggestions concerning the relative roles of the long term exposure to pollutants and the exposure to the smog episode; (2) indications of the influence of prior cardio-respiratory illness on reaction to the episode and on subsequent health; (3) more refined measures of the relationship between subsequent health and various environmental factors. Additional substantive analyses undoubtedly will be suggested as this work progresses.

In connection with the analyses involving the environmental factors of residence, occupation, and smoking history it is clear that additional research is needed on methods of classifying and scaling these variables to permit the study of their association with the manifestations of ill health over a period of time.

The lack of knowledge as to what syndrome(s) appears most pertinent for air pollution health studies is a vexing problem for all researchers in this area. In the hope of obtaining more specific information on this question we recommend that a more detailed medical appraisal of the current health status of selected persons from the Donora population be obtained. This more detailed appraisal would require the cooperation of the physicians treating the Donora population. While this recommendation has been made specific to the Donora population, we feel that any future studies of the air pollution - health problem should place great emphasis on obtaining a more complete clinical and physiological appraisal of the persons under study. The development of pulmonary function test apparatus that can successfully be used for quantifying pulmonary impairments of large population groups would provide one means for making this kind of appraisal.

Section II

DETAILED FINDINGS

During the 1948-1949 study of the October 1948 smog episode in Donora, questions were asked of a sample of Donora area residents. These questions concerned the presence or absence of symptoms attributable to the smog, the degree of disability suffered, and medical care received. On the basis of his answer, a sample person was classified as "not affected", or "affected", either "mildly", "moderately" or "severely". (Air Pollution in Donora, Pennsylvania, Public Health Bulletin, No. 306, pp. 11, 12.) Since the classification given the individual sample person was not indicated on the household record available to us and we were unable to discover this information from any other record of the 1948 survey, each of the 4092 persons used in the 1948 survey and included in our study has been reclassified by us according to our interpretation of the scheme used in 1948. Table 1 shows the results of this reclassification, while Table 2 shows the results of the original classification made by the U.S.P.H.S. in the 1948 survey.* Table 1 and 2 differ in another significant way. Since our resurvey includes only those 1948 sample persons who were residents of the Borough of Donora in October of 1948, the Table 1 figures represent only those 4092 residents and not the entire 1948 sample group of persons living in the Donora area represented in Table 2.

It should be noted that these differences are reflected to a considerable degree in corresponding entries in the two tables. While there is fairly close agreement between the two tables on the percentage ill and not ill, there are marked differences in the mild, moderate and severe illness columns. In general, the number of persons in the moderately ill

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*In Table 2, which is taken from Public Health Bulletin, No, 306, p. 13, we have substituted the term "illness status" for the term "degree of affection" used in the Bulletin. See first footnote, p. 66 of this report.

TABLE 1. ESTIMATED INCIDENCE OF ILLNESS AMONG PERSONS OF INDICATED SEX AND AGE RESIDING IN THE BOROUGH OF DONORA DURING THE 1948 SMOG EPISODE*

Ages in Years	Percent of Persons of Indicated Sex and Age Reporting Illness											
	Both Sexes				Males				Females			
	Total	Illness Status			Total	Illness Status			Total	Illness Status		
		Mild	Moderate	Severe		Mild	Moderate	Severe		Mild	Moderate	Severe
All Ages	40.6	10.8	22.6	7.2	40.6	9.8	23.4	7.4	40.5	11.9	21.7	7.0
Under 6	13.0	6.3	5.3	1.4	14.4	8.9	3.8	1.7	11.2	3.1	7.1	1.0
6-12	28.8	14.6	11.8	2.3	25.7	13.7	9.1	2.9	32.6	15.8	15.3	1.6
13-19	27.0	11.4	13.6	2.0	25.7	11.2	12.6	1.9	28.4	11.6	14.7	2.1
20-24	29.8	9.7	17.6	2.5	29.1	10.3	15.2	3.6	30.5	9.1	20.1	1.3
25-29	38.5	11.4	22.8	4.3	34.8	7.0	24.1	3.8	41.5	15.0	21.8	4.7
30-34	44.3	12.3	27.6	4.4	44.0	7.1	32.1	4.8	44.4	16.7	23.7	4.0
35-39	49.3	13.3	29.7	6.3	51.3	11.0	35.1	5.2	47.3	15.8	24.0	7.5
40-44	50.8	15.5	27.3	8.0	51.3	14.8	32.2	4.3	50.4	16.3	22.8	11.4
45-49	57.2	11.4	36.0	9.8	59.7	10.1	40.3	9.4	54.4	12.8	31.2	10.4
50-54	55.6	15.1	28.9	11.7	59.0	13.9	30.3	14.8	52.1	16.2	27.4	8.5
55-59	53.8	6.2	35.8	11.9	56.5	6.1	37.4	12.9	50.4	6.2	33.6	10.6
60-64	60.9	6.7	32.9	21.3	60.4	6.7	32.8	20.9	61.5	6.6	33.0	22.0
65 and over	56.1	6.3	27.5	22.3	57.0	6.3	29.2	21.5	55.2	6.4	25.6	23.2

*Based on the classification of the illness status of the 4092 residents of Donora included in the 1948-49 USPHS study. The illness classification was accomplished during the current investigation by reference to the original 1948 record for each person.

TABLE 1. ESTIMATED INCIDENCE OF ILLNESS AMONG PERSONS OF INDICATED SEX AND AGE RESIDING IN THE BOROUGH OF DONORA DURING THE 1948 SMOG EPISODE*

Ages in Years	Percent of Persons of Indicated Sex and Age Reporting Illness											
	Both Sexes				Males				Females			
		Illness Status				Illness Status				Illness Status		
	Total	Mild	Moderate	Severe	Total	Mild	Moderate	Severe	Total	Mild	Moderate	Severe
All Ages	40.6	10.8	22.6	7.2	40.6	9.8	23.4	7.4	40.5	11.9	21.7	7.0
Under 6	13.0	6.3	5.3	1.4	14.4	8.9	3.8	1.7	11.2	3.1	7.1	1.0
6-12	28.8	14.6	11.8	2.3	25.7	13.7	9.1	2.9	32.6	15.8	15.3	1.6
13-19	27.0	11.4	13.6	2.0	25.7	11.2	12.6	1.9	28.4	11.6	14.7	2.1
20-24	29.8	9.7	17.6	2.5	29.1	10.3	15.2	3.6	30.5	9.1	20.1	1.3
25-29	38.5	11.4	22.8	4.3	34.8	7.0	24.1	3.8	41.5	15.0	21.8	4.7
30-34	44.3	12.3	27.6	4.4	44.0	7.1	32.1	4.8	44.4	16.7	23.7	4.0
35-39	49.3	13.3	29.7	6.3	51.3	11.0	35.1	5.2	47.3	15.8	24.0	7.5
40-44	50.8	15.5	27.3	8.0	51.3	14.8	32.2	4.3	50.4	16.3	22.8	11.4
45-49	57.2	11.4	36.0	9.8	59.7	10.1	40.3	9.4	54.4	12.8	31.2	10.4
50-54	55.6	15.1	28.9	11.7	59.0	13.9	30.3	14.8	52.1	16.2	27.4	8.5
55-59	53.8	6.2	35.8	11.9	56.5	6.1	37.4	12.9	50.4	6.2	33.6	10.6
60-64	60.9	6.7	32.9	21.3	60.4	6.7	32.8	20.9	61.5	6.6	33.0	22.0
65 and over	56.1	6.3	27.5	22.3	57.0	6.3	29.2	21.5	55.2	6.4	25.6	23.2

*Based on the classification of the illness status of the 4092 residents of Donora included in the 1948-49 USPHS study. The illness classification was accomplished during the current investigation by reference to the original 1948 record for each person.

TABLE 2. INCIDENCE OF SMOG AFFECTION AMONG PERSONS OF INDICATED SEX AND AGE IN DONORA AREA*

Age in Years	Percent of persons of indicated sex and age reporting affection from smog											
	Both Sexes				Males				Females			
	Total	Illness Status			Total	Illness Status			Total	Illness Status		
		Mild	Moderate	Severe		Mild	Moderate	Severe		Mild	Moderate	Severe
All Ages	42.7	15.5	16.8	10.4	43.0	14.7	17.4	10.9	42.4	16.4	16.1	9.9
Under 6	15.9	9.8	4.3	1.8	17.8	12.5	3.4	1.9	13.7	6.6	5.3	1.8
6-12	29.6	15.7	11.0	2.9	27.1	15.7	8.2	3.2	32.7	15.7	14.4	2.6
13-19	27.3	15.2	9.6	2.5	25.6	14.8	8.5	2.3	29.0	15.7	10.6	2.7
20-24	31.2	13.9	13.1	4.2	31.1	14.1	11.9	5.1	31.3	13.7	14.3	3.3
25-29	40.3	18.8	14.9	6.6	39.2	15.5	16.0	7.7	41.1	21.4	14.0	5.7
30-34	48.0	17.1	22.8	8.1	50.0	14.6	26.3	9.1	46.2	19.3	19.7	7.2
35-39	52.3	19.5	23.7	9.1	53.9	16.2	29.9	7.8	50.6	22.8	17.3	10.5
40-44	54.9	22.2	21.8	10.9	55.9	22.1	23.6	10.2	54.0	22.3	20.2	11.5
45-49	57.1	17.8	24.7	14.6	57.5	17.7	24.8	15.0	56.7	17.9	24.6	14.2
50-54	59.4	18.9	22.0	18.5	60.9	14.1	27.3	19.5	58.0	23.7	16.8	17.5
55-59	58.1	13.7	24.0	20.4	60.5	14.7	22.9	22.9	55.1	12.6	25.2	17.3
60-64	63.3	11.0	22.9	29.4	63.0	10.3	24.0	28.7	63.6	12.1	21.2	30.3
65 and over	59.8	10.6	20.3	28.9	60.6	10.9	21.2	28.5	58.9	10.3	19.2	29.4

*Reproduced from Public Health Bulletin, No. 306, p. 13.

class is larger in Table 1 than in Table 2. This increase is at the expense of the numbers in both the mild and severe illness classes. A complete check of the coding of the illness status has disclosed only a very few coding errors. If we were to add the 518 additional persons included in Table 2 to our Table 1 figures the same differences would be found. We, therefore, conclude that the observed differences between corresponding entries in Tables 1 and 2 are attributable to the aforementioned differences in interpreting the rules for classification on the two occasions. Since, for the purposes of this report, we are using Table 1 as the basic classification of illness status, it is important to keep in mind the differences between Table 1 and 2 when comparing the findings in this report with the findings of the 1948-49 community survey.

A. Mortality Comparisons

1. Donora and other Places

Information on mortality since October, 1948 among the 4092 residents was obtained in a number of ways. The personal interview questionnaire furnished the first leads on deaths among the sample group. The mail questionnaire was the second source. Additional leads on mortality were obtained from undelivered letters to sample persons which were followed-up with a request to the post office for information concerning change of address or possible death. The death records since October, 1948, of the local registrar were also checked against the sample listing. As a result of all these efforts information on death or present residence was obtained for all but forty-one of the original 4092 persons.

For the reported deaths occuring within the State, the death certificate information concerning date and cause of death was obtained from the Pennsylvania Department of Health or the Donora Registrar. In the remaining cases the date and cause of death mentioned in the original source of information has been utilized. Death certificate information was obtained for 290 of the 314 persons reported dead.

The frequency and rates for the various causes of deaths are recorded in Table 3. The corresponding rates for resident deaths in Pennsylvania (1954 and 1956) and Washington County (1956) are included in the table. (Anyone familiar with the problems of comparability in inter-community studies will recognize that these comparisons of mortality rates are of limited usefulness. Nevertheless, we thought it best to include them for the sake of completeness and for whatever suggestions they may offer.)

Donora's average annual mortality from all causes since 1948 is roughly the same as the mortality rate for Washington County in 1951 and somewhat less than the 1954 and 1956 rates for the State of Pennsylvania.

Mortality from cardiovascular-renal diseases in Donora is also less than in Pennsylvania. However, certain subdivisions of cardiovascular-renal causes of death, viz: (1) degenerative nonrheumatic disease, (2) other heart disease, (3) nephritis, (4) other circulatory diseases and (5) vascular lesions of the central nervous system have higher rates in Donora than in Pennsylvania. For the rates in these categories, only (1) degenerative non-rheumatic and (5) vascular lesions, central nervous system are based on more than 10 Donora deaths. Finally, "pneumonia and influenza" and "tuberculosis, all forms" have lower rates in Donora than in Pennsylvania.

TABLE 3. DONORA MORTALITY 1948-1957 BY CAUSE OF DEATH; PENNSYLVANIA AND WASHINGTON COUNTY, PENNA., MORTALITY RATES BY CAUSE, 1954 AND 1956

Cause of Death	Donora 1948-1957		Pennsylvania[b/]		Washington County[b/]
	Number of Deaths	Annual Average[a/]	1954[c/]	1956[c/]	1956[c/]
All Causes(001-999)[d]	314	902	998	1029	916
Cardiovascular Renal (330-34,400-68,590-94)	189	544	-	590	541
General Arteriosclerosis (450)	2	6	23	24	18
Heart Disease(410-43)	137	394	407	429	375
Arteriosclerotic(420)	75	215	268	294	289
Chronic Rheumatic(410-416)	5	14	15	14	11
Degenerative non-rheumatic(421-22)	33	95	56	55	41
With hypertension(440-43)	16	46	55	54	26
Other heart disease (430-434)	8	24	14	11	9
Hypertension without heart disease(444-47)	1	2	7	7	4
Nephritis(590-94)	6	18	14	12	13
Other circulatory disease (451-68, 780-2, 400-2)	5	14	8	10	6
Vascular lesions,CNS(330-34)	38	109	106	108	124
External Causes(800-985)	12	34	-	80	71
Cirhossis of liver(581)	7	20	11	11	14
Diabetes Mellitus(260)	3	8	22	21	12
Neoplasms, malignant(140-205)	56	161	165	168	140
Pneumonia and influenza (480-93)	4	12	22	27	15
Tuberculosis,all forms (001-19)	2	6	11	10	6
Other known causes(residual)	34	98	-	111	115
Unknown causes	7	20	*	*	*

(a) Deaths per 100,000 population; dea^hs/population divided by 8.5 (years of follow-up).

(b) Source: Statistical Supplement, Annual Report, 1956; Commonwealth of Pennsylvania Department of Health, Harrisburg, Pennsylvania, pp. 4, 65.

(c) Deaths per 100,000 population

(d) Code numbers, Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death, Sixth Revision.

(-) Not available

(*) Not applicable

The causes of death as related to age, sex and illness are tabulated in full in Section III. The number of deaths and the populations involved are so small that chance variations in the rates from one group to another must also be considered an important factor in examining group differences.

The average annual death rates by age in Donora since October, 1948 for the leading causes of death are contrasted with the corresponding rates for Pennsylvania in 1956 in Table 4. For all causes, the group of Donora persons aged 45-64 in 1948 has a somewhat higher rate than that for Pennsylvania in 1956, while the other two age groups have lower rates in Donora than in Pennsylvania as a whole. In the two youngest age groups mortality from diseases of the heart, cirrhosis of the liver, and malignant neoplasms is higher in Donora than in Pennsylvania, while mortality from vascular lesions affecting the central nervous system is higher in Donora in each age group. Other differences may be noted in the table.

Turning from cause of death to total mortality in Donora during the eight and one-half year period several interesting facts appear. In Table 5 the observed mortality and survivorship by age is contrasted with the corresponding expected figures using mortality rates for the United States for the period 1949-1951. It will be observed that the base population has been increased from 4092 to 4106 and the observed deaths from 314 to 320. These adjustments are required to (1) take into account deaths that occurred among 1948 sample persons during the period between the smog episode and the time of attempted interview in late 1948

TABLE 4. DONORA MORTALITY 1948-1957 AND PENNSYLVANIA MORTALITY 1956 BY CAUSE OF DEATH AND AGE

Cause of Death	Age (Years)							
	All Ages		Less than 45		45-64		65 and over	
	Donora[a]	Penna.[b]	Donora	Penna.	Donora	Penna.	Donora	Penna.
All Causes	902	1029	154	206	1751	1297	5671	6932
Heart Disease	394	429	37	21	726	538	2941	3388
Neoplasms, malignant	161	168	33	20	358	301	779	1014
Vascular lesions	109	108	8	4	167	102	952	936
External Causes	34	61	21	36	35	99	173	223
Pneumonia and influenza	12	27	-	9	12	21	129	175
General Arteriosclerosis	6	24	-	-	-	-	87	257
Diabetes Mellitus	8	21	-	2	24	31	44	154
Nephritis	18	12	-	3	35	17	87	71
Cirhossis of liver	20	11	16	2	35	26	-	47
Tuberculosis, all forms	6	10	5	3	12	20	-	41
Hypertension without heart	2	7	5	1	-	7	-	59
Bronchitis	2	1	-	1	1	1	-	6
All Others	109	145	25	92	274	152	346	563
Unknown	20	-	-	-	60	-	87	-

(a) Average annual deaths per 100,000 population in 1948

(b) Source: Statistical Supplement, Annual Report, 1956; Commonwealth of Pennsylvania, Department of Health, Harrisburg, Pennsylvania, p. 8, Deaths per 100,000 mid-year population.

or early 1949 and (2) deaths that occurred among 1948 sample persons between the time of interview in 1957 and April 1, 1957.

There is an indication in Table 5 that observed eight and one half year survival rates exceed expected rates at the earlier ages, agree closely in the middle ages and then are less than expectations in the two oldest age groups. Total observed and expected mortality, however, agree closely. Table 6 shows, on an annual basis, this same close agreement between observed survivorship and survivorship rates calculated from 1950 U. S. Life Tables.

In Table 7, where mortality rates are broken down by sex, the males exceed expected rates only in the age group "65 and older", while observed female mortality exceeds expectation in the four oldest age groups.

From these comparisons, limited as they necessarily must be, the only conclusion that seems warranted is that during the period 1948-1957 the mortality experience of the Donora sample was not strikingly different from that of the United States.

2. Persons Ill and Not Ill in 1948, Donora

In Table 8 estimates are presented of the expected mortality based on the U. S. Life Table population for the ill and not ill groups separately by age. The data of Table 8 reveal that in total the not ill during the episode experienced lower mortality than the U. S. population while the ill experienced a higher mortality. These differences appear for nearly all the age classes. Differences of the same kind, but not as consistently appear when the data are further broken down by sex (Table 9).

TABLE 5. OBSERVED DONORA MORTALITY AND SURVIVORSHIP, OCTOBER 1948 TO APRIL 1957 AND LIFE TABLE MORTALITY AND SURVIVORSHIP BASED ON MORTALITY RATES FOR THE TOTAL UNITED STATES POPULATION, 1950, BY AGE

Age in 1948	Number of Persons	Observed			Life Table		
		Survivors	Deaths	Survival Rates	Survivors	Deaths	Survival Rates
Under 6	432	430	2	.995	425.2	6.8	.984
6-19	826	824	2	.998	818.9	7.1	.991
20-34	1039	1025	14	.987	1020.5	18.5	.982
35-44	540	520	20	.963	518.7	21.3	.961
45-54	504	456	48	.905	456.4	47.6	.906
55-64	489	387	102	.791	392.0	97.0	.802
65 and older	272	140	132	.515	149.0	123.0	.548
Unknown	4	4	--		4	--	
Total	4106	3786	320	.922	3785	321	.922

TABLE 6. ANNUAL OBSERVED DONORA MORTALITY AND SURVIVORSHIP AND LIFE TABLE MORTALITY AND SURVIVORSHIP BASED ON MORTALITY RATES FOR THE TOTAL UNITED STATES POPULATION, 1950

Year	Observed					Life Table		
	Survivors [a]	Deaths During Year	Cumulative Deaths	Survival Rate[b]	Survivors	Deaths During Year	Cumulative Deaths	Survival Rate
1948-1949	4106	31	31	99.2	4106.0	32.8	32.8	99.2
1949-1950	4075	40	71	98.2	4073.2	37.0	69.8	98.3
1950-1951	4035	37	108	97.4	4036.2	32.8	102.6	97.5
1951-1952	3998	37	145	96.5	4003.4	37.0	139.6	96.6
1952-1953	3961	41	186	95.5	3966.4	41.1	180.7	95.7
1953-1954	3920	43	229	94.4	3925.3	28.7	209.4	94.9
1954-1955	3877	44	273	93.4	3896.6	45.2	254.6	93.8
1955-1956	3833	34	307	92.5	3851.4	45.1	299.7	92.7
Oct. 30, 1956 to Apr. 30, 1957	3799	13	320	92.2	3806.3	20.6	320.3	92.2
April 30, 1957	3786		320	92.2	3785.7		320.3	92.2

(a) Survivors October 30, 1948 and on each annual anniversary of this date.

(b) Year end survival October 29, 1949 and each annual anniversary of this date.

TABLE 7. OBSERVED DONORA MORTALITY AND SURVIVORSHIP AND LIFE TABLE MORTALITY AND SURVIVORSHIP BY SEX AND AGE; OCTOBER 30, 1948 TO APRIL 30, 1957

Life Table Calculations Based on Total
U.S. Male and Total U.S. Female
Mortality Rates, 1950.

Age in 1948	Males					Females				
	Number of Persons	Observed		Life Table		Number of Persons	Observed		Life Table	
		Survivors	Deaths	Survivors	Deaths		Survivors	Deaths	Survivors	Deaths
Under 6	236	235	1	233.4	2.6	196	195	1	194.4	1.6
6-19	446	445	1	441.2	4.8	380	379	1	377.9	2.1
20-34	493	485	8	483.0	10.0	546	540	6	538.3	7.7
35-44	270	267	3	256.0	13.6	270	253	17	261.1	8.9
45-54	261	235	26	229.7	31.3	243	221	22	225.5	17.5
55-64	284	218	66	215.5	68.5	205	169	36	174.0	31.0
65 and older	145	68	76	76.6	68.4	127	71	56	71.9	55.1
Unknown	1	1	-	1.0	-	3	3	-	3	-
Total	2136	1955	181	1937	199	1970	1831	139	1846	124

TABLE 8. OBSERVED DONORA MORTALITY AND LIFE TABLE MORTALITY BY ILLNESS STATUS AND AGE; OCTOBER 30, 1948 TO APRIL 30, 1957

Life Table Calculations based on
Mortality rates for total U.S.
Population, 1950

Age in 1948	Not Ill During Episode					Ill During Episode				
	Number of Persons	Observed		Life Table		Number of Persons	Observed		Life Table	
		Survivors	Deaths	Survivors	Deaths		Survivors	Deaths	Survivors	Deaths
Under 6	376	375	1	372.2	3.8	56	55	1	55.6	0.4
6-19	596	594	2	590.7	5.3	230	230	-	228.2	1.8
20-24	646	642	4	634.9	11.1	393	383	10	386.0	7.0
35-44	271	264	7	259.6	11.4	269	256	13	257.7	11.3
45-54	220	196	24	198.8	21.2	284	260	24	256.7	27.3
55-64	209	172	37	168.5	40.5	280	215	65	224.1	55.9
65 and over	118	62	56	60.4	57.6	154	78	76	88.5	65.5
Unknown	3	3	-	3.0	-	1	1	-	1.0	-
Total	2439	2308	131	2288	151	1667	1478	189	1498	169

TABLE 9. OBSERVED DONORA MORTALITY AND LIFE TABLE MORTALITY BY ILLNESS STATUS AGE AND SEX; OCTOBER 30, 1948 TO APRIL 30, 1957

Life Table Calculations based on Mortality Rates for Total U.S. Male and Total U.S. Female Population

Age in 1948	Not Ill Males					Not Ill Females				
	Number of Persons	Observed		Life Table		Number of Persons	Observed		Life Table	
		Survivors	Deaths	Survivors	Deaths		Survivors	Deaths	Survivors	Deaths
Under 6	202	201	1	199.7	2.3	174	174	-	172.5	1.5
6-19	332	331	1	328.5	3.5	264	263	1	262.5	1.5
20-24	315	313	2	308.9	6.1	331	329	2	326.4	4.6
35-44	132	131	1	125.2	6.8	139	133	6	134.4	4.6
45-54	106	93	13	93.9	12.1	114	103	11	105.7	8.3
55-64	118	96	22	89.9	28.1	91	76	15	77.6	13.4
65 and older	62	31	31	30.0	32.0	56	31	25	29.8	26.2
Unknown	-	-	-	--	--	3	3	-	3.0	--
Total	1267	1196	71	1176	91	1172	1112	60	1112	60
	Ill Males					Ill Females				
Under 6	34	34	-	33.4	0.6	22	21	1	21.6	0.4
6-19	114	114	-	112.7	1.3	116	116	-	115.4	0.6
20-24	178	172	6	174.2	3.8	215	211	4	211.8	3.2
35-44	138	136	2	131.3	6.7	131	120	11	126.7	4.3
45-54	155	142	13	136.5	18.5	129	118	11	119.6	9.4
55-64	166	122	44	125.6	40.4	114	93	21	96.4	17.6
65 and older	83	38	45	45.4	37.6	71	40	31	42.3	28.7
Unknown	1	1	-	1.0	--	--	-	-	-	-
Total	869	759	110	760	109	798	719	79	734	64

The eight and one-half year age-sex specific mortality rates for the affected and not affected groups demonstrate the same pattern with the affected group having the higher rate in each of the six age-sex categories utilized in Table 10. The pattern among those reported ill in 1948 shows mortality rates increasing with severity of reported illness for each age-sex category. In a few cases, the mildly and moderately ill persons have lower mortality rates than the corresponding not ill group. In every instance, however, the severely ill group has higher mortality rates than the corresponding not ill group.*

A priori, some portion of the mortality differential between the affected and not affected groups could reasonably be attributed to the fact that persons known to be incapacitated with cardio-respiratory illness prior to the episode became ill and died during the episode at higher rates than those persons free of cardio-respiratory difficulties. Table 10A reveals that, among persons 50 and older in 1948 who reported heart disease, asthma, or bronchitis in the USPHS study, subsequent mortality does not differ by reaction to the smog episode. In the age group 21-49, however, persons of both sexes who became ill during the episode have died subsequently at substantially higher rates than persons who did not become ill.

The annual age-specific mortality rates for the ill and not ill groups have been computed but no discernible pattern relating illness status and time of death was evident. This tabulation has

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*This reversal of the pattern, i.e., persons in the "mildly affected" group displaying lower mortality and morbidity rates than persons reported "not affected" in 1948 reappears several times in our findings.

TABLE 10. NUMBER OF DEATHS AND AGE-SEX SPECIFIC DEATH RATES CLASSIFIED BY 1948 ILLNESS STATUS; DONORA, 1948-1957*

Age in 1948	Sex	Not Ill		Ill								Total	
				Total		Mild		Moderate		Severe			
		Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent
Under 45	Male	5	.5	8	1.7	3	2.0	2	.8	3	6.3	13	.9
	Female	8	.9	16	3.3	3	1.7	10	3.9	3	5.7	24	1.7
45-64	Male	34	15.2	57	17.9	4	8.2	32	16.7	21	26.9	91	6.3
	Female	25	12.3	31	12.8	7	14.6	14	10.1	10	18.2	56	12.6
65 and over	Male	30	48.4	44	53.0	3	30.0	20	47.6	21	67.7	74	51.0
	Female	25	42.4	31	45.6	2	25.0	14	43.8	15	46.9	56	44.1
Total	Male	69	5.5	109	12.6	10	4.8	54	10.8	45	28.7	178	8.4
	Female	58	5.0	78	9.8	12	5.2	38	8.9	28	20.6	136	6.9

*Based on the 314 deaths occuring among the 4092 residents of Donora included in the 1948-49 United States Public Health Study.

TABLE 10A. NUMBER OF DEATHS AND AGE-SEX SPECIFIC DEATH RATES AMONG PERSONS REPORTING HISTORY OF HEART DISEASE, ASTHMA, BRONCHITIS, OR PNEUMONIA IN 1948 CLASSIFIED BY ILLNESS STATUS; DONORA, 1948-1957

Sex	Age in 1948	Illness Status			
		Ill		Not Ill	
		Death	Per Cent	Deaths	Per Cent
Male	21-49	7	10.1	1	2.5
	50 or older	33	37.1	19	39.1
Female	21-49	10	13.3	2	3.8
	50 or older	20	29.9	8	32.0
Total		70		30	

therefore been omitted. A summary of annual survivorship is included in Table 11.

A comparison between the ill and not ill groups with respect to cause of death is shown in Table 12. Among the four leading causes of death, where the death frequencies are somewhat larger, only arteriosclerotic heart disease exhibits a difference between the ill and not ill groups. It is interesting to note that for both males and females of the group reporting illness in 1948, the 8 1/2 year age-adjusted mortality rates increase with the severity of illness reported. It should also be noted that mildly ill females have a lower age-adjusted mortality from arterio-sclerotic heart disease than do the not ill females.

From the preceeding mortality comparisons, it appears that (1) total survivorship is higher for the persons not reporting illness in 1948 than for those reporting illness; (2) this difference can be seen in the mortality rates for several causes of death; (3) the difference in mortality is general for all age groups and both sexes, and (4) among those reporting illness in 1948, the differences in mortality rates, in general, increase with severity of reported illness.

B. Morbidity Comparisons

All the findings in this section are based on information from one of three sources: the personal interview questionnaire, the mail questionnaire, and the death certificate. Approximately eight per cent of the 1948 sample are not included in these comparisons due to our failure to locate them or to interview them when located. The number in each incomplete category and an analysis of the possible influences on the comparisons is included

TABLE 11. ANNUAL OBSERVED DONORA MORTALITY AND LIFE TABLE MORTALITY BY ILLNESS STATUS

Life Table Calculations based on Mortality
Rates for Total U. S. Population, 1950

Year	Not Ill During Episode							
	Observed				Life Table			
	Survivors[a]	Deaths	Total Deaths	Survival Rate[b]	Survivors	Deaths	Total Deaths	Survival Rate
1948-1949	2439	12	12	99.5	2439	19.5	19.5	99.2
1949-1950	2427	12	24	99.0	2419.5	12.2	31.7	98.7
1950-1951	2415	9	33	98.6	2407.3	19.5	51.2	97.9
1951-1952	2406	14	47	98.1	2387.8	14.7	65.9	97.3
1952-1953	2392	19	66	97.3	2373.1	19.5	85.4	96.5
1953-1954	2373	20	86	96.5	2353.6	14.6	100.0	95.9
1954-1955	2353	19	105	95.7	2339.0	19.5	119.5	95.1
1955-1956	2334	16	121	95.0	2319.5	19.5	139.0	94.3
1956-Apr.30, 1957	2318	10	131	94.6	2300.0	9.8	148.8	93.9
April 30, 1957	2308				2290.2			
				Ill				
1948-1949	1667	19	19	98.9	1667	16.7	16.7	99.0
1949-1950	1648	28	47	97.2	1650.3	20.0	36.7	97.8
1950-1951	1620	28	75	95.5	1630.3	18.3	55.0	96.7
1951-1952	1592	23	98	94.1	1612.0	18.3	73.3	95.6
1952-1953	1569	22	120	92.8	1593.7	20.1	93.4	94.4
1953-1954	1547	23	143	91.4	1573.6	18.3	111.7	93.3
1954-1955	1524	25	168	89.9	1555.3	25.0	136.7	91.8
1955-1956	1499	18	186	88.8	1530.3	23.3	160.0	90.4
1956-Apr.30, 1957	1481	3	189	88.7	1507.0	10.0	170.0	89.8
April 30, 1957	1478				1497.0			

(a) Survivors October 30, 1948 and on each annual anniversary of this date
(b) Year end survival October 29, 1949 and each annual anniversary of this date

TABLE 12. AGE ADJUSTED EIGHT AND ONE-HALF YEAR MORTALITY RATES* FOR THE FOUR LEADING CAUSES OF DEATH BY SEX, AND ILLNESS STATUS, DONORA, 1948-1957

Cause of Death	Sex	Illness Status				
		Not Ill	Ill			
			Total	Mild	Moderate	Severe
Arteriosclerotic Heart Disease(420)	Male	1.2	3.1	1.2	2.7	3.4
	Female	1.6	1.7	.9	2.0	2.5
Degenerative non-rheumatic Heart Disease(421, 422)	Male	.9	.9	-	.5	2.2
	Female	.8	.7	-	1.3	-
Malignant neoplasms (140-205)	Male	1.5	1.3	1.6	1.0	1.7
	Female	1.2	.8	2.4	.7	1.5
Vascular lesions affecting the Central Nervous System (300-334)	Male	1.4	.8	-	1.2	.4
	Female	.8	.8	.8	.2	1.7

*Adjusted to the age distribution of the 4092 residents of Donora included in the 1948-49 United States Public Health Service Study.

later in Section II under Methodology Notes". It should be emphasized that at the time of the 1957 interview, interviewers were not aware of the 1948 illness status of the persons interviewed.

1. General

The questionnaire used in our study employed a check list including eleven chronic diseases and conditions. The responses of the surviving 1948 residents of Donora who had been included in the PHS study to our questionnaire showed a greater prevalence of reports of one or more of these eleven chronic diseases among those "ill" than among those "not ill" in 1948. As Table 13 shows, this finding applies to all ages and both sexes.

In addition to the chronic disease check list, the questionnaire included a check list of symptoms frequently associated with diseases of the cardio-vascular and respiratory system. (See questionnaire, Appendix C.) When the responses to the questions concerning the presence of these symptoms are tabulated according to the respondents' reaction to the 1948 smog episode the same picture emerges as for the chronic disease reports.

Table 14 shows that more persons "ill" in 1948 now have more of the listed symptoms than do the "not ill" persons. This finding applies to every age and sex group except the youngest males.

It should be noted that, for both chronic disease as a whole and cardio-vascular and respiratory symptoms in particular, females more frequently report symptoms than do males at all ages. For the males the differences increase with age while the females

TABLE 13. PREVALENCE* OF ONE OR MORE CHRONIC DISEASES BY AGE, SEX, AND ILLNESS STATUS; DONORA, 1957

(Interviewed Persons Only)

Age in 1948	Male		Female	
	Ill	Not Ill	Ill	Not Ill
Under 20	119	97	154	71
20-34	224	172	228	134
35-49	281	244	395	363
50 or older	468	359	570	477
All Ages	295	178	343	199

*Interviewed persons reporting one or more chronic diseases per 1000 population; DISEASES INCLUDED: Rheumatism and arthritis, heart disease, rheumatic fever, high blood pressure, diabetes, chronic bronchitis, chronic sinus trouble, asthma, kidney trouble, hardening of the arteries, hernia-rupture.

TABLE 14. PREVALENCE* OF ONE OR MORE CARDIO-VASCULAR AND RESPIRATORY SYMPTOMS BY AGE, SEX, AND ILLNESS STATUS; DONORA, 1957

(Personally Interviewed Persons Only)

Age in 1948	Male		Female	
	Ill	Not Ill	Ill	Not Ill
Under 20	43	61	130	63
20-34	154	138	271	174
35-49	165	159	331	297
50 or older	288	235	473	372
All Ages	180	124	314	192

*Personally interviewed persons reporting one or more symptoms per 1000 population; for symptoms included see Appendix.

exhibit large differences in each age group except the 35-49 year old category. It is clear, from the consistency of these differences in age-specific comparisons, that the older average age of the "ill" group is not the major reason for the observed differences in the crude rate of prevalence. (See footnote, page 1)

As Table 15 shows, a higher proportion of those persons reported "ill" in 1948 have been hospitalized for all causes (except maternity) than those reported "not ill". This finding applies to each age-sex category (except females 20-34, where the figures are almost equal).

As a summary of this general type of information concerning morbidity in the ill and not ill groups, Table 16 has been prepared. In setting up this table, we isolated from the rest of the 1948 study group Donora residents those persons who:

(1) died during the intervening 8 1/2 years since the episode

(2) currently report disablement, chronic disease or symptoms, and/or

(3) are currently under a physician's care for any reason.

We have called these persons Type S persons. The figures in Table 16 indicate the proportion of Type S persons among those reported "ill" and those reported "not ill" in 1948.

It will be noted that the persons ill in 1948 have a higher proportion of Type S persons than the persons not ill in 1948. The higher proportion of Type S among the "ill" persons is consistent in every age-sex category, with differences ranging from four per cent to as high as eighteen per cent in the various cells of the table.

TABLE 15. PROPORTION OF PERSONS HOSPITALIZED* ONE OR MORE TIMES DURING OCTOBER 1948 TO APRIL 1957 BY AGE, SEX, AND ILLNESS STATUS; DONORA

(Interviewed Persons Only)

Age in 1948	Male		Female	
	Ill	Not Ill	Ill	Not Ill
Under 20	23.0	22.3	38.5	23.6
20-34	26.3	23.3	25.7	26.5
35-49	29.2	22.1	43.1	35.2
50 or older	35.2	31.4	40.1	37.4
All Ages	29.2	23.8	36.2	28.5

*Hospitalization for all causes exclusive of pregnancy and normal delivery.

TABLE 16. PROPORTION OF TYPE S PERSONS* BY AGE, SEX, AND ILLNESS STATUS

(Interviewed Persons Only)

Age in 1948	Male		Female	
	Ill	Not Ill	Ill	Not Ill
Under 20	200	136	345	168
20-34	351	285	453	338
35-49	430	347	597	503
50 or older	707	643	772	729

*For the definition of type S persons see text. Entries are numbers of persons per 1000 population.

If severity of reported illness in 1948 is taken into consideration the differences are magnified. A comparison of the proportion of Type S persons among severely ill males and females with their not ill counterparts is shown in Table 17.

2. Specific Disease Conditions

Cardio-vascular-renal disease and diseases of the respiratory system are logical candidates for study in connection with air pollution. Among the chronic diseases and conditions included in the aforementioned questionnaire are several cardio-vascular-renal and respiratory diseases, including: heart disease, high blood pressure, hardening of the arteries, asthma, chronic bronchitis, chronic sinus trouble, and kidney trouble. The prevalence of one or more of these conditions among persons in the ill group is generally higher than in the not ill group, (See Table 18). The only exception to this pattern occurs in the oldest female age group. The numbers of ill and not ill are, respectively, 31 and 30. The rates in these two cells of Table 18, therefore, are not very stable; hence, the reversal noted may be only sampling variation.

For the chronic conditions considered in Table 18, seventy-six per cent of the persons reported to have the diseases have seen a physician since October, 1948, for the condition and base their report on what their physician told them. This proportion when broken down by age-groups is similar for both the "ill" and "not ill" groups. Approximately twenty per cent of the persons reporting these diseases have been hospitalized since October, 1948 for at least one of the conditions reported. In total, 524 persons reported one or more of the chronic conditions and 102

TABLE 17. PROPORTION OF TYPE S PERSONS* BY AGE, SEX, AND ILLNESS STATUS

(Interviewed Persons Only)

Age in 1948	Male		Female	
	Severely Ill	Not Ill	Severely Ill	Not Ill
Under 20	636	136	714	168
20-34	294	285	529	338
35-49	696	347	639	503
50 or older	833	643	892	729
All Ages	726	308	760	379

*For the definition of Type S persons see text. Entries are numbers of persons per 1000 population.

TABLE 18. PREVALENCE* OF ONE OR MORE OF A SELECTED GROUP OF CHRONIC CONDITIONS** BY AGE, SEX, AND ILLNESS STATUS; DONORA, 1957

(Interviewed Persons Only)

Age in 1948	Male		Female	
	Ill	Not Ill	Ill	Not Ill
Under 20	96	47	108	57
20-34	135	100	168	82
35-49	151	140	275	212
50-64	238	195	393	312
65 and older	343	133	467	469
All Ages	169	95	243	134

*Persons reporting one or more of the conditions per 1000 population

**Includes heart disease, high blood pressure, hardening of the arteries, asthma, chronic bronchitis, chronic sinus trouble, and kidney trouble.

of these persons were hospitalized.

Among the diseases investigated, heart disease, chronic bronchitis and asthma are of particular interest. Looking first at the findings concerning heart disease, 111 of the interviewed persons were reported to have one or another of the diseases covered by this term. An estimated thirty-one persons per 1000 survivors from the 1948 Donora population are now reported to have heart disease. The relation of heart disease prevalence in 1957 to reported illness during the 1948 smog episode is shown in Table 19. Here again the surviving ill males and females have, in general, higher prevalence of heart disease than their not ill counterparts at all ages with a single exception. Considering the size of the surviving population in each cell of the table and the fact that only a total of 111 cases of disease are involved, the consistency of this relationship seems remarkable. Table 19 has not been subdivided by degree of illness. However, if this factor is considered it is interesting to note that in the three oldest age groups 53 of the 60 reported cases of heart disease are in the categories moderately or severely ill and only seven in the mildly ill, indicating again that the rates of prevalence increase sharply with degree of illness reported in 1948.

The divergence from the general pattern exhibited by the females over 65 in Table 18 is not present in the heart disease tabulations of Table 19. On the contrary, the increasing rates of prevalence with age among the females is in contrast to the dropping off of the rates of prevalence in the males over sixty-five years of age,

TABLE 19. PREVALENCE* OF HEART DISEASE BY AGE, SEX, AND ILLNESS STATUS; DONORA, 1957

(Interviewed Persons Only)

Age in 1948	Male		Female	
	Ill	Not Ill	Ill	Not Ill
Under 20	15	-	23	7
20-34	19	11	5	10
35-49	31	17	72	56
50-64	110	49	93	72
65 or older	86	33	156	143
All Ages	49	12	51	28

Persons reporting heart disease per 1000 population a phenomenon observed in other community morbidity studies.

In the study conducted by the Public Health Service in Donora following the smog episode a question concerning heart disease was included. Taking the group of persons reported not to have heart disease in 1948 and utilizing both the 1957 interview responses and the information concerning cause of death on the death certificates, an eight and one-half year incidence rate for reported heart disease may be calculated for the ill and not ill groups. Table 20 exhibits these rates.

Of the 200 cases of heart disease on which this tabulation is based, eighty-one were reported during the interview and the remaining 119 were listed as the cause of death on the death certificates.

It is clear from Table 20 that ill males have had a higher incidence of diseases of the heart since October, 1948, than not ill males. However, no clear cut relation between illness and heart disease incidence is evident for the females.

Chronic bronchitis and asthma incidence rates have been calculated in a similar way. Age specific rates in the ill group are generally higher than the corresponding rates in the not ill group. The numbers of cases of these two diseases are small, totalling 45 for chronic bronchitis and 44 for asthma. It should also be remembered that the amount of understatement of illness histories by the persons interviewed cannot be determined but, if known, might greatly affect the figures of Tables 20 and 21. Reference may be made to the basic tabulations in Section III for the details.

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* It is possible that this "dropping off" in prevalence rate of males over 65 is a result of increased mortality among older males following the onset of a heart disease.

TABLE 20. INCIDENCE* OF HEART DISEASE BY AGE, SEX, AND ILLNESS STATUS OCTOBER 1948 TO APRIL 1957, DONORA

Age in 1948	Male		Female	
	Ill	Not Ill	Ill	Not Ill
Under 20	15	-	16	10
20-34	19	11	10	10
35-49	40	23	50	39
50-64	139	128	122	119
65 or older	373	172	259	354
All Ages	87	32	64	44

*Persons alive and reporting heart disease, 1957 or dead since October, 1948 from diseases of the heart per 1000 population not reporting heart disease, October, 1948.

TABLE 21. INCIDENCE* OF ONE OR MORE OF THE DISEASES: HEART DISEASE, CHRONIC BRONCHITIS, OR ASTHMA, BY AGE, SEX, AND ILLNESS STATUS; DONORA, 1948 to 1957

Age in 1948	Male		Female	
	Ill	Not Ill	Ill	Not Ill
Under 20	39	13	17	15
20-34	39	21	42	20
35-49	63	29	65	57
50-64	165	144	175	135
65 or older	339	196	327	300

*Persons alive and reporting one or more of the diseases, or dying since 1948 from one of the diseases, per 1000 population reporting none of these diseases in October, 1948.

The relation between illness and the incidence of one or more of the diseases, heart disease, chronic bronchitis or asthma, is summarised in Figure 1 and Table 21.

Diabetes, arthritis and rheumatism were included on the chronic disease check list employed. The cases of diabetes reported were too few to warrant subdivision by age, sex and illness status in 1948. However, 337 cases of arthritis and rheumatism were reported. The relation between illness and prevalence of this disease in the study group is examined in Table 22. No association between rheumatism and illness is evident among females. However, a clearly higher rate among ill males exists in each age category.

Some additional findings on arthritis and rheumatism will be presented in Section C.

C. Community Comparisons

We have made comparisons of the residents of Donora included in the 1948 study with three other groups for which we have health information. These three groups are (1) the Arsenal District of Pittsburgh (1952); (2) Butler County, Pennsylvania (1954) and (3) a random sample of one-third of the 1957 residents of the Borough of Donora.

For the first two groups, our information was obtained from health studies which included several of the disease questions which we have used in the Donora study. The information on the 1957 Donora residents was obtained by us during the course of our 1957 Donora census. It is recognized that comparisons of one community with another raise difficult questions concerning interpretation. These difficulties relate to the basic comparability of the communities on factors other than the ones on which interest is centered. In the present

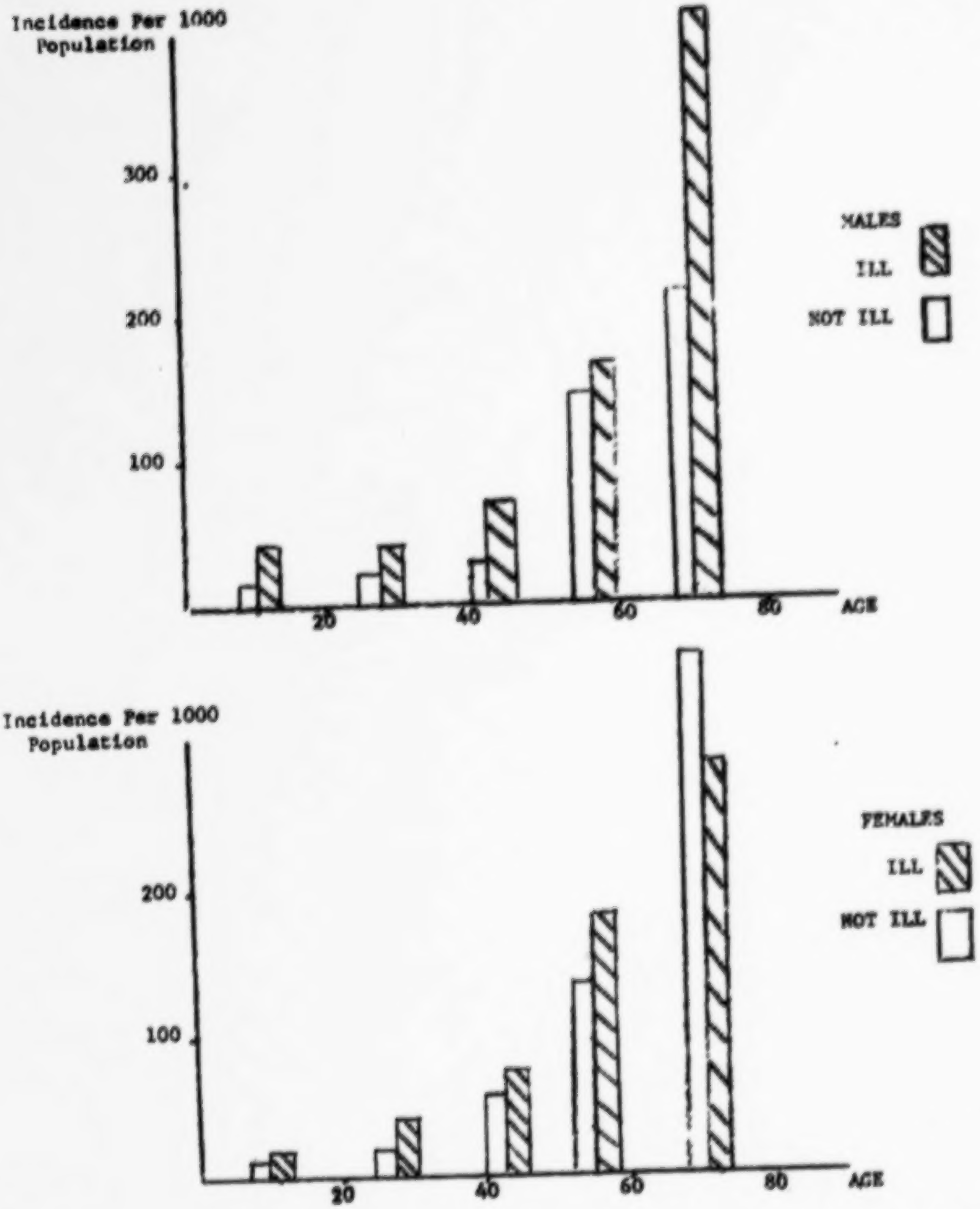

FIGURE 1. Incidence of one or more of the diseases, heart disease, chronic bronchitis, or asthma; October 1948 to April, 1957.

TABLE 22. PREVALENCE* OF ARTHRITIS OR RHEUMATISM BY AGE, SEX, AND ILLNESS STATUS; DONORA, 1957
(Interviewed Persons Only)

Age in 1948	Male		Female	
	Ill	Not Ill	Ill	Not Ill
Under 20	45	20	51	22
35-49	146	76	204	212
50-64	221	163	293	264
65 or older	314	200	186	179
All Ages	132	50	146	88

*Persons reporting arthritis or rheumatism per 1000 population.

instance all 1948 Donora residents were exposed to the smog episode and for differing lengths of time were exposed to the Donora environment both before and since the episode. A comparison between the 1948 Donora Study group and the two other communities on the prevalence of reported cardiac and respiratory disease could be made under the assumption that the Donora environment subjected the 1948 study group to heavier air borne pollution than residents of the two other communities. Operating under this assumption, the community comparison presumably would test the hypothesis that heavy air pollution affects the cardio-respiratory system.

Table 23 shows the prevalence of heart disease reported by all four groups, divided according to age-groups. (Note: Since the 1948 study group now has an average age almost ten years older than the average age of persons in the other three studies, all comparisons must be made on an age-specific basis). Classification by sex has been omitted in Tables 23 and 24 because the pattern of differences in prevalence rates between the sexes within each age group is similar for all four studies.

In comparing the 1948 survivors with the other three columns (Table 23), we note a general similarity among them. It is clear that reported heart disease for the 1948 group is not generally higher than for the two other communities, or for the 1957 Donora group. A community comparison of respiratory illness is limited by the fact that, of the respiratory diseases investigated in Donora, only asthma data are available for the other two communities. Table 24 summarizes these findings. As in the case of heart disease, we note the similarity among the four columns.

We have also compared the prevalences of rheumatism and arthritis for these four groups. In Table 25, we find the same inter-community relationship we found in the Heart Disease and Asthma tables, i.e., little or no difference in pre-

TABLE 23. PREVALENCE* OF REPORTED HEART DISEASE IN DONORA (1957), PITTSBURGH (1952), AND BUTLER COUNTY(1954), PENNSYLVANIA BY AGE

Age	Survivors of 1948 Donora Study	1957 Donora Residents	Arsenal Health District Pittsburgh, 1952	Butler County 1954
0-14	4	3	10	6
15-24	7	6	11	10
25-34	8	12	6	19
35-44	18	8	18	17
45-54	51	30	29	55
55-64	55	68	59	86
65 and older	99	90	77	97

*Persons reporting heart disease per 1000 population

TABLE 24. PREVALENCE* OF REPORTED ASTHMA IN DONORA (1957), PITTSBURGH (1952), AND BUTLER COUNTY (1954) PENNSYLVANIA BY AGE

Age	Survivors of 1948 Donora Study	1957 Donora Residents	Arsenal Health District Pittsburgh, 1952	Butler County 1954
0-14	7	9	6	19
15-24	12	11	6	12
25-34	15	15	6	11
35-44	13	13	21	17
45-54	24	19	9	19
55-64	20	43	24	54
65 and older	51	44	33	29

*Persons reporting asthma per 1000 population

TABLE 25. PREVALENCE* OF REPORTED ARTHRITIS AND RHEUMATISM IN DONORA (1957), PITTSBURGH (1952), AND BUTLER COUNTY (1954), PENNSYLVANIA BY AGE AND SEX

Age	Survivors of 1948 Donora Study		1957 Donora Residents		Arsenal Health District Pittsburgh, 1952		Butler County 1954	
	Male	Female	Male	Female	Male	Female	Male	Female
35-44	64	61	37	97	37	71	39	85
45-54	98	208	98	233	48	121	70	129
55-64	211	254	209	229	91	158	130	204
65 and over	205	270	175	268	172	264	213	315

*Persons reporting arthritis and rheumatism per 1000 population valence among these four groups. We have already noted, in the Morbidity Findings section of this report, that males among the group reported ill in 1948 had a higher prevalence of arthritis and rheumatism than their "not ill" contemporaries.

A comparison between the 1948 survivors and the other three columns, taking sex into consideration, produces a similar relationship. The males of the 1948 group generally have a higher prevalence of arthritis and rheumatism than the males of the other two communities.* We have no explanation for this apparent relation between reported illness among males and arthritis.

Other community comparisons are included in the appendix, but since they do not point to any differences between Donora and the other two communities they will be omitted here.

The conclusion we have drawn from these findings is that, if Donora residence during some time interval including the smog episode of 1948 represents a greater exposure to air pollutants than does residence in Butler County and the Arsenal Health District of Pittsburgh or residence in the Borough of Donora in 1957, there is little evidence in these data that greater exposure is associated with higher prevalence for the diseases studied.

D. Examination of Certain Other Factors

For the findings presented in this section our sources were (1) the 1948 PHS study, from which we obtained occupation and residence histories and (2) our 1957 interviews, which included questions on occupation, residence and smoking habits. The search for possible relations between these environmental factors, illness, and subsequent health experience is a time-consuming undertaking. This is one reason why we have subjected to thorough investigation only the more obvious and not the more subtle possible relationships between these factors and health effects. Another reason for the limited nature of our investigations in this field is that our findings have produced little to suggest that variations in these environmental factors are associated with effects which are measurable in terms of the data available.

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*Again, there appears to be no such difference among the females for any of the four groups in Table 25.

Information on smoking history was obtained from all persons personally interviewed. The questioning was necessarily brief and elicited only the number of years a respondent had smoked (cigarettes, cigars, or pipe) and the number of cigarettes per day he usually smoked at the time of the interview in 1957. In the younger age groups almost all persons giving a history of smoking were smoking cigarettes in 1957. In the older age groups cigar and pipe smoking account for a larger proportion of the smokers although cigarette smoking still predominates.

The relation between smoking tobacco in any form and reaction to the smog episode is examined in Table 26. Among the persons surviving in 1957 who were personally interviewed there is no evidence in these data that those who smoked prior to or at the time of the episode became ill at a higher rate than those who did not smoke. It will be observed that the number of women smokers over age 45 in 1948 is too small to warrant further investigation.

In Tables 27, 28, and 29 the subsequent illness experience of smokers has been contrasted with the experience of persons who have never smoked. All these tables show the same results for males: smokers have higher rates of the illness considered than non-smokers. With few exceptions the males who became ill during the episode and who have smoked for nine or more years have the highest rates, while the non-smokers who did not become ill during the episode have the lowest rates. No consistent pattern was discernible for the females in the age groups considered as is demonstrated in Table 27.

In general, these findings are similar to the association between smoking and various kinds of illness reported by other workers. (See e.g., Doll, R. and Hill, A. B., British Medical Journal, 2, 1071 (1956), and Hammond, E. C.,

TABLE 26. SMOKING HISTORY AMONG PERSONS(1) PERSONALLY INTERVIEWED IN 1957 BY AGE, SEX; AND 1948 ILLNESS STATUS; DONORA

Sex	1948		Smoked				Never Smoked		Total	
	Age	Illness Status	9 or More years[1]		8 or less year					
			Percent	No.	Percent	Number	Percent	Number	Percent	Number
Male	13-44	Ill	53	150	13	37	34	96	100	283
		Not Ill	53	243	13	58	34	159	100	460
	45 and over	Ill	56	130	4	9	40	94	100	233
		Not Ill	61	109	3	5	36	66	100	180
Female	13-44	Ill	19	56	9	28	72	211	100	295
		Not Ill	24	117	10	51	66	319	100	487
	45 and over	Ill	3	5	-	1	97	185	100	191
		Not Ill	4	8	3	5	93	174	100	187

(1) Only persons for whom no report of heart disease, asthma, or bronchitis was given in 1948 are included in this tabulation.

(2) This group includes persons who either were smoking in 1948 or have a long history of smoking prior to that date.

TABLE 27. INCIDENCE[1] OF REPORTED ASTHMA, BRONCHITIS, OR HEART DISEASES AMONG PERSONALLY INTERVIEWED PERSONS IN 1957 BY AGE, SEX, 1948 ILLNESS STATUS AND SMOKING HISTORY; DONORA 1948-1957.

Sex	1948		Smoked				Never Smoked	
	Age	Illness Status	9 or more years		8 or less years			
			Cases	Rate/1000	Cases	Rate/1000	Cases	Rate/1000
Male	13-44	Ill	7	47	1	27	4	42
		Not Ill	7	29	0	-	2	13
	45 and over	Ill	20	154	*	*	8	85
		Not Ill	6	55	*	*	4	61
Female	13-44	Ill	2	36	0	-	12	57
		Not Ill	1	9	1	20	10	31
	45 and over	Ill	*	*	*	*	19	103
		Not Ill	*	*	*	*	16	92

(1) Cases of these diseases whose onset is within this time interval but which have resulted in death within the period are omitted since smoking history was determined only for the living in 1957.

* Less than 10 persons in the category.

TABLE 28. PREVALENCE OF TYPE S PERSONS (RATE PER 1000) IN 1957 BY AGE 1948 ILLNESS STATUS AND SMOKING HISTORY.

(Personally Interviewed Males,Donora, 1957)

1948		Smoked	Never Smoked
Age	Illness Status	9 Or More Years	
34 or less	Ill	365	208
	Not Ill	310	142
35 - 49	Ill	398	431
	Not Ill	343	286
50 - 64	Ill	608	557
	Not Ill	562	442
65 and older	Ill	737	533
	Not Ill	467	422

TABLE 29. PREVALENCE OF CHRONIC DISEASE (RATE PER 1000) IN 1957 BY AGE, 1948 ILLNESS STATUS AND SMOKING HISTORY (PERSONALLY INTERVIEWED MALES, DONORA, 1957)

Age	1948 Illness Status	Smoked 9 or More Years	Never Smoked
34 or less	Ill	153	100
	Not Ill	88	41
35 - 49	Ill	139	123
	Not Ill	133	143
50 - 64	Ill	237	229
	Not Ill	205	140
65 and older	Ill	474	200
	Not Ill	200	77

Horn, D., J.A.M.A. 166, 1159, 1294 (1958)) These data, however, do provide an opportunity to examine a question that has been raised concerning the interpretation of the smoking - illness association: Does the acquisition of the smoking habit differ according to past illness experience?

The following data relate illness status, as reported in 1948, to the subsequent smoking experience of a group of young persons who had not started to smoke in 1948. Among the individuals interviewed in 1957 there are 144 males and 161 females who were between the ages of 12 and 20 years in 1948 and who stated that they had not begun to smoke prior to the survey date in 1948. The cumulative frequency with which the smoking habit was acquired by specified age has been estimated separately for the males who were reported ill in 1948 and those who were not reported ill at the time. These estimates are shown in Table 30.

Calculations similar to those in Table 30 have been made also for females, but no consistent pattern is found probably because of the small number of the 161 females who acquired the cigarette smoking habit in the period considered.

Although the numbers in Table 30 are too small to warrant definitive conclusions, the calculations clearly indicate that males who were reported ill in 1948 acquired the smoking habit more frequently and at a more rapid rate than those who were not reported ill at the time. These findings, together with those of Fisher, and the considerations of Berkson emphasize the need to investigate how the smoking habit is acquired, and by whom, in order to understand the meaning of the relationship between smoking and morbidity or mortality. (See Fisher, R. A., Nature 181, 108 (1958) and Berkson, J., J.A.S.A. 53, 28 (1958)).

The interpretation of the associations present in Tables 26 through 30 is also complicated by the possible influences of mortality and movement from the Borough on these results. The disturbance of mortality can be minimized by examining the relations in the age group under 45 where little mortality

TABLE 30. ILLNESS STATUS OF NON-SMOKING MALES 12 to 20 YEARS OF AGE IN 1948 AND CUMULATIVE FREQUENCY WITH WHICH THE SMOKING HABIT WAS ACQUIRED BY SPECIFIED AGE BETWEEN 1948 AND 1957.

Illness Status in 1948	No.	Non-Smokers who began to Smoke Cigarettes by Specified Age (Cumulated rate per 100 non-smokers in 1948)															
		13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Ill	44	0	0	6	11	19	25	30	39	46	50	57	62	62	64	72	77
Not Ill	100	0	0	0	4	9	16	20	27	33	36	40	44	48	51	51	58

occurred. Since the smoking history was not obtained by mail questionnaire no knowledge of the influence of movement on these results is available. From investigation of the relation between movement and illness characteristics included in a subsequent section and other studies to be reported elsewhere it is our impression that movement has not created a serious bias in these results.

During the 1948 study, place of residence was considered as a possible factor in determining the reaction to the smog episode. No relation was discovered between place of residence and degree of illness by the methods employed in the 1948 study. This relationship has been re-examined using a different method of subdivision of the residential areas of the Borough. Five contiguous areas were defined, with roughly the same population. The area boundaries separate generally the low lying residential areas near the Monongahela River from the higher areas on the hills overlooking the river. A map showing the area boundaries is presented in Figure 2.

Differences in proportion ill during the 1948 episode are in evidence for the areas thus defined. (See Table 31)* The crude rate of reported illness is highest in Area 1 and lowest in Area 5. In general, Areas 1, 2 and 3 have higher rates than Areas 4 and 5. Area 4 is situated away from the river on the valley slope and both Areas 4 and 5 are on the periphery away from the center of the community industrial activity. Areas 1, 2, and 3, on the other hand are centrally located, with 1 and 3 having the additional property of bordering on the Monongahela River at the bottom of the valley. Parts of Areas 1, 2, and 3, moreover, share the characteristic thay they lie in the streamline of the prevailing air currents from the center of the community industrial works under stable atmospheric conditions.

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*In Table 31, we have subdivided the residents of the five areas by age and sex. We had hoped to be able to further subdivide according to various socio-economic, ethnic, cultural characteristics. The numbers of persons involved, however, are so small that such detailed subdivisions are not feasible.

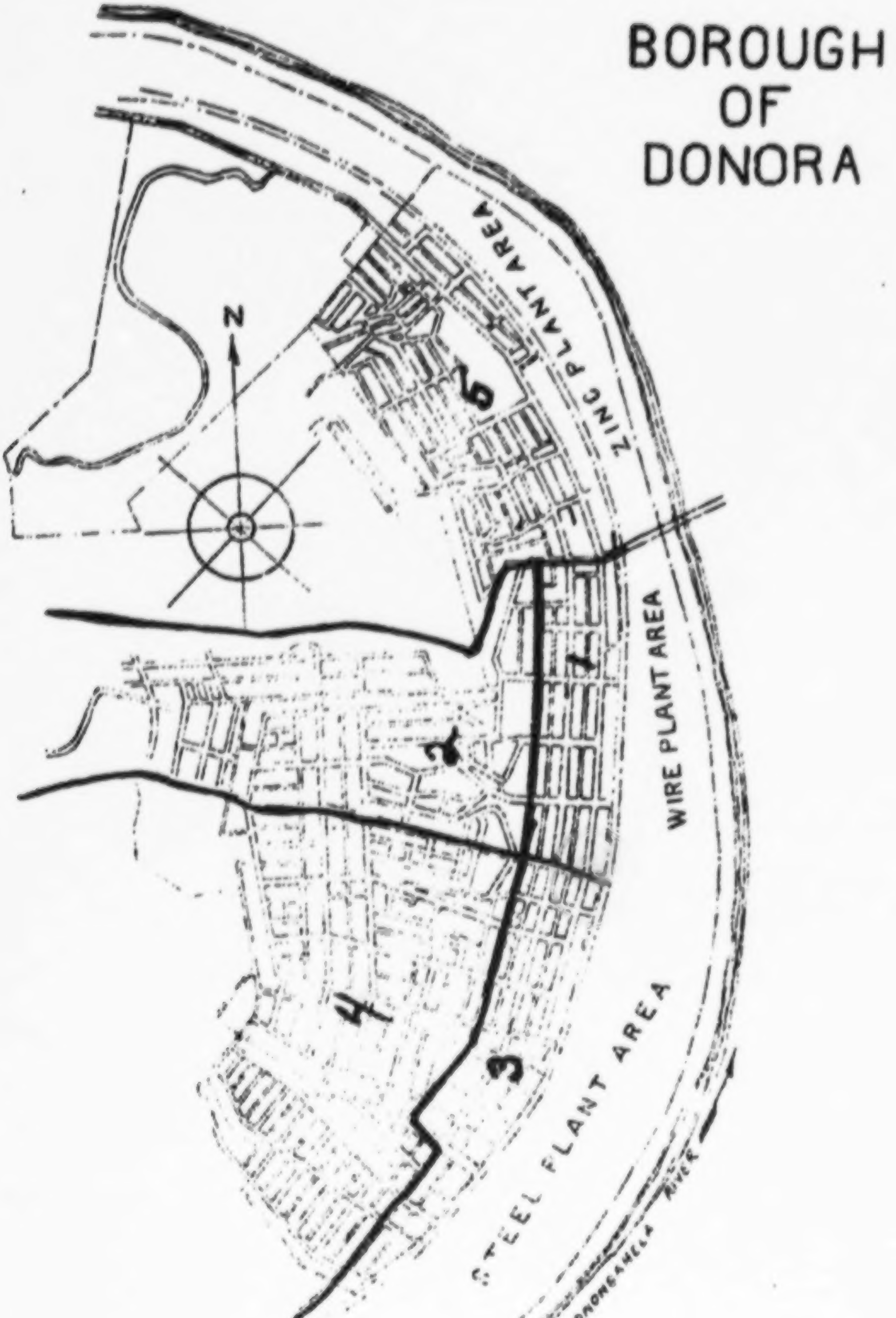
BOROUGH OF DONORA
N
ZINC PLANT AREA
WIRE PLANT AREA
STEEL PLANT AREA
MONONGAHELA RIVER
1
2
3
4
5
0
1/2 MILE

TABLE 31. RATES* OF ILLNESS DURING OCTOBER 1948 EPISODE
BY PLACE OF RESIDENCE IN 1948, AGE AND SEX; DONORA

Residence Area	Male				Female			
	Age				Age			
	19 or less	20-50	50 or older	All Ages	19 or less	20-50	50 or older	All Ages
1	193	496	610	453	474	500	565	512
2	218	506	646	448	209	485	647	439
3	273	491	554	433	268	476	554	438
4	256	417	571	402	208	410	571	397
5	147	268	466	275	150	312	393	267
All Areas	222	443	584	409	240	443	566	414

*Persons reporting illness per 1000 population

Diseases of the cardio-vascular and respiratory systems among nonemployed females in the five areas have been investigated. We chose non-employed females in order to avoid confusion between exposure to air pollution in the area of residence and occupational exposure to dust, gases, and other respiratory irritants. Table 32 shows the age adjusted area rates for a number of conditions based on a total population of 434 females who have not changed their place of residence from that occupied in October, 1948, and who, in addition, have never been employed outside the home.

There is a suggestion of association between an area's ranking on proportion of females affected during the episode and its rank on prevalence of heart and/or respiratory disease in Table 32. However, this association is not as striking when one considers the two categories of illness separately, particularly in terms of heart disease.

Data on place of birth and years of residence in Donora are examined as possible factors related to illness during the episode and health experience since the episode in Tables 33 and 34. Table 33 shows a lower rate of illness among females born in Donora than those born elsewhere for each age group. In the males, there is an exception to this tendency in the middle age group. The pattern of this table would seem to suggest that those persons who were born in Donora and remained there were in general less affected by the smog episode than those persons of the same age who were born elsewhere and hence on the average had fewer years of exposure to the Donora environment.

However, when years of residence in Donora are examined against reaction to the smog episode there appears to be little evidence of relation between illness and years of residence. For the youngest age group illness rates increase with years of residence in Donora. In the middle age group these rates decrease with years of exposure, and in the oldest age group no monotonic trend is present. A relationship between illness and residence history is definitely not indicated by these data.

TABLE 32. RATES OF ILLNESS DURING OCTOBER 1948 EPISODE, HEART DISEASE, AND RESPIRATORY CONDITIONS, 1957; BY PLACE OF RESIDENCE, NON-EMPLOYED FEMALES, DONORA

Area	Proportion of females ill during smog episode	Heart Disease[a,c]	Chronic Respiratory Disease[a,b,c]	Heart Disease and/or Respiratory Disease[a,c]
1	48%	183	101	267
2	44%	180	97	256
3	43%	217	38	236
4	39%	181	76	248
5	27%	172	58	214

a. Reports during interview in 1957 or deaths since 1948 from specified cause per 1000 population.

b. Respiratory conditions included are asthma, chronic bronchitis, and chronic sinus trouble.

c. Age adjusted to the age distribution of the 434 females with no change in residence since 1948 and no work experience outside the home.

TABLE 33. RATE OF ILLNESS[a] DURING SMOG EPISODE BY AGE, SEX, AND PLACE OF BIRTH;DONORA, 1948
(Interviewed Persons Only)

Age in 1948	Male		Female	
	Born in Donora	Not Born in Donora	Born in Donora	Not Born in Donora
Under 20	217	245	217	348
20-34	387	323	372	439
35-50	494	552	456	496

a. Persons affected per 1000 population

TABLE 34. RATE OF ILLNESS[a] DURING SMOG EPISODE FOR FEMALES BY YEARS OF RESIDENCE IN DONORA

Age in 1948	Years of Donora Residence in 1957		
	Less than 12	13 - 19	20 or more
6-19	161	288	301
20-49	500	483	423
50 and over	875	455	524

a. Persons affected per 1000 population

The examination of possible relations between occupation, on the one hand and health experience since 1948 on the other, has thus far uncovered no associations that suggest that more exhaustive study of the present data would be fruitful. We are thus led to the conclusion that if these environmental factors are related to either the reaction to the smog episode or to subsequent health experience or to their joint relation we have not been able to detect it in our data. Basic tabulations not presented in this summary are included in Section III.

E. Methodologic Notes

Since our study was essentially of a longitudinal or "follow-up" nature, the follow-up taking place eight and one-half years after the event, we were faced with some problems not found in the usual cross section survey. As public health interest in the problems of chronic disease and chronic or long-term exposure to the various elements in the human environment increases, the need for longitudinal investigations is likely to increase. We, therefore, have devoted this final section to noting some of the more important problems we encountered as a result of the time lapse, indicating (1) what methods we used to cope with these problems, (2) what success we achieved and (3) what effect inaccuracies caused by the time lapse may have had on our findings.

Our first job was to locate the 4092 persons who were residents of Donora in the Fall of 1948, using as our source the listing of names and addresses compiled by the U. S. Public Health Service. Our plan included a complete census of the Borough of Donora, inquiry at each of the listed addresses concerning the present whereabouts of 1948 sample persons formerly residing at that address, and inquiry at each household found to contain a 1948 sample person concerning the present residence of all other 1948 sample persons who had resided with him at the time of the episode. (The reasons for choosing this plan instead of merely tracing the 1948 residents directly from the address list are given in the Prospectus.) A master file, giving information on all persons who had moved out of the Borough of Donora since the 1948 study was established. This file which included, where known, the present addresses of these former residents enabled us to organize interview assignments to various neighboring communities with the greatest economy of man-hours and money and helped us to determine for which persons a mailed questionnaire would prove more feasible.

The results obtained with this procedure were very good. As a matter of fact, the completion rate for this part of the study compares favorably with the completion rates experienced in many surveys where the population group residing in a given area on the day of the survey is the universe under study. From Table 35 it will be observed that interview or death certificate information was obtained for more than 92 per cent of the 4092 persons included in the 1948 study. Among the incomplete records there are 41 cases where no exact information could be obtained concerning the present whereabouts of the person sought or whether he was dead or alive. These 41 cases comprise 1 per cent of the 1948 study group. Some information was obtained concerning each of the remaining persons in the incomplete category. Addresses were obtained for these persons and questionnaires were mailed to them. If the questionnaire was not returned by the post office it was assumed to have been delivered and the person was counted as alive. If the questionnaire was returned by the post office a corrected or more complete address was sought locally in Donora from the person furnishing the original address and the questionnaire was remailed. Eighteen non-delivered questionnaires remained at the completion of the field work. These are included in the category "known to be alive" due to the remarks made by the person furnishing the address; e.g., "I saw her last week, she lives somewhere in the East Liberty section of Pittsburgh but I don't know her address".

From the record of completion it may be concluded that in follow-up studies conducted in small communities, similar to Donora, the procedure employed warrants consideration.

TABLE 35. COMPLETION RECORD IN THE 1957 FOLLOW-UP OF 4092
PERSONS STUDIED IN 1948-49,
DONORA, PENNSYLVANIA

Sex Age in 1948	Completed					Not Completed				Total
	Total	Deceased	Interviewed			Known to Be Alive			Unknown	
							Moved from Donora			
			Personally	By Mail	Other	Refusals and Not Contacted	Questionnaire not returned	Inadequate address		
MALE										
Under 6	226	1	215	10	-	-	6	1	3	236
6-19	378	1	311	66	-	11	54	3	1	447
20-34	442	7	409	25	1	12	26	4	7	491
35-44	258	3	244	10	1	5	4	-	2	269
45-54	242	28	209	5	-	9	4	2	4	261
55-64	261	62	190	8	1	5	8	2	5	281
65 and older	136	71	64	1	-	2	4	-	2	144
Male Total	1943	173	1642	125	3	44	106	12	24	2129
Percent	91.3					2.1	5.0	0.6	1.1	
FEMALE										
Under 6	187	1	179	7	-	-	9	-	-	196
6-19	352	1	302	47	2	5	19	3	1	380
20-34	514	6	468	38	2	6	15	2	8	545
35-44	250	15	227	7	1	7	8	1	3	269
45-54	229	17	205	6	1	4	7	-	2	242
55-64	199	35	159	5	-	1	2	-	2	204
65 and older	117	55	58	4	-	3	6	-	1	127
Female Total	1848	130	1598	114	6	26	66	6	17	1963
Percent	94.1					1.3	3.4	0.5	0.9	
Totals	3791	303	3240	239	9	70	172	18	41	4092
Percent	92.6					1.7	4.2	0.4	1.0	

As we have already noted in the Prospectus, one of the reasons that we decided against the obvious plan of using the PHS address list to locate the 1948 sample persons was the mobility of the listed persons over the eight and one half years since the list was compiled. The problem of mobility of subjects is one which can be expected to crop up in any study of a follow-up nature. Some reports of mobility in population groups are available in the literature, but current figures for periods of more than one year are difficult to find. We thought, therefore, that it might be helpful to tabulate our data on the degree of mobility of the 1948 Donora population over an eight and one half year period. These findings are summarized in Table 36. It will be noted that, of the original group, only 42 per cent were found to occupy the same residence in 1948 and 1957. The younger groups in general are more mobile than the older. In particular, for the group of persons under 35 years of age in 1948, approximately one out of every three persons has moved from the Borough during the eight and one half year period. From the records it appears that military service is in part accountable for the high proportion of males aged 6-19 in 1948 who have since moved from the "Tri-State" area.

Since mortality information and some morbidity data were obtained for a large proportion of the group of persons who have moved from Donora since 1948, these data may be used in tests of the accuracy of proposed methods of analysis for longitudinal studies that properly account for the group of persons lost to follow-up.

We have tried to estimate what effect, if any, the subsequent health histories of those 1948 study persons for whom we were unable to get complete follow-up information might have had on our findings. We compared the 1948 reported illness of the persons for whom our information is incomplete with those for whom we have complete records. This comparison is shown in Table 37. One may note that gross illness rates in the two groups are similar. There is a tendency for the older gropps in the incomplete category to have

TABLE 36. MOBILITY AND MORTALITY IN AN EIGHT AND ONE HALF YEAR PERIOD AMONG 4092 PERSONS IN DONORA, PENNSYLVANIA

A. MALES

AGE IN 1948

Type	6 or less		6-19		20-34		35-49		50 or older	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Died, October 1948-April 1957	1	.004	1	.002	7	.014	18	.045	146	.266
Remained at same residence	81	.342	164	.368	160	.327	199	.490	270	.490
Changed residence within Donora	88	.371	110	.246	156	.318	113	.280	69	.126
Moved from Donora:		.270		.382		.326		.177		.100
To Washington, Westmoreland, or Allegheny County, Pennsylvania	49	.207	53	.119	113	.231	55	.136	32	.058
To other parts of Pennsylvania or West Virginia or Ohio	5	.021	31	.070	11	.022	7	.017	6	.011
To other States in the United States	8	.034	73	.164	33	.067	9	.022	16	.029
To other countries	2	.008	13	.029	3	.006	1	.002	1	.002
Movement Unknown	3	.013	1	.002	7	.014	3	.007	11	.018
Total*	237	100	446	100	490	100	405	100	551	100

*Some small discrepancies in the frequencies at each age are apparent between this table and Table 30. These are due to the use of the 1948 age as calculated from that reported in 1957 in some few cases. This was a more convenient procedure in these cases, and the resulting discrepancies are trivial in nature.

TABLE 36. (CONT.) MOBILITY AND MORTALITY IN AN EIGHT AND ONE HALF YEAR PERIOD AMONG 4092 PERSONS IN DONORA, PENNSYLVANIA

B. FEMALES

Age in 1948

Type	6 or less		6-19		20-34		35-49		50 or older		Both Sexes Total	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Died, October 1948-April 1957	1	.005	1	.003	6	.011	19	.048	103	.230	303	.074
Remained at same residence	71	.362	136	.356	179	.328	218	.552	243	.545	1721	.420
Changed residence within Donora	59	.301	105	.275	171	.313	90	.229	48	.545	1010	.247
Moved from Donora:		.331		.364		.333		.158		.111		-
To Washington, Westmoreland, or Allegheny County, Pennsylvania.	50	.255	74	.194	133	.244	38	.098	25	.060	625	.153
To Other Parts of Pennsylvania or West Virginia or Ohio	4	.020	25	.065	12	.022	8	.020	6	.013	115	.028
To Other States in the United States	7	.036	35	.092	33	.060	16	.040	16	.036	246	.060
To Other Countries	4	.020	5	.013	4	.007	0		1	.002	34	.008
Movement unknown	0		1	.003	8	.015	5	.013	3	.007	41	.010
Total*	196	100	382	100	546	100	394	100	445	100	4092	100

*Some small discrepancies in the frequencies at each age are apparent between this table and Table 30. These are due to the use of the 1948 age as calculated from that reported in 1957 in some few cases. This was a more convenient procedure in these cases, and the resulting discrepancies are trivial in nature.

TABLE 37. REPORTED ILLNESS DURING THE SMOG EPISODE AMONG PERSONS INTERVIEWED AND NOT INTERVIEWED IN 1957 BY AGE AND SEX

Interview Status	Age in 1948	Males			Females		
		Not Ill	Ill		Not Ill	Ill	
		Number	Number	Per Cent Ill	Number	Number	Per Cent Ill
Completed interview, 1957	0-19	466	135	22.5	407	130	24.2
	19-35	279	156	35.9	306	202	39.7
	35-50	172	192	52.7	179	167	48.1
	50-65	123	181	59.5	125	140	52.8
	65 and older	30	35	53.8	30	32	48.4
	Total	1070	699	39.5	1047	671	38.9
Persons not interviewed, 1957	0-19	66	14	17.5	30	7	19.9
	19-35	33	16	32.7	22	9	29.0
	35-50	9	17	65.4	10	19	65.5
	50-65	13	11	45.8	3	5	62.5
	65 and older	2	6	75.0	3	7	70.0
	Total	123	64	34.2	68	47	40.9
Deceased since 1948	0-35	4	5	55.6	3	5	62.5
	35-50	6	12	66.7	6	13	68.4
	50-65	31	44	58.7	19	29	60.4
	65 and older	30	41	57.7	25	30	56.6
	Total	71	102	59.0	53	77	60.2

higher 1948 illness rates, but the numbers involved are so small that even if this tendency were found to be reflected in the subsequent health history of these people, the effect of these new data on our findings would be slight.

In interviewing persons from the 1948 study group we encountered a high degree of memory failure.* As Table 38 shows, interview subjects in 1957 tended, in general, to understate the illness they had suffered in 1948.

Considering only those reported "affected" in 1948 the column totals indicate that memory improves as the severity of reported illness in 1948 increases, Approximately two-thirds of the persons classed as severely affected in 1948 reported in 1957 that they became ill during the episode. Among those classified as mildly affected, less than one quarter reported in 1957 that they had become ill during the episode. This tendency to understate is found consistently at all ages and for both sexes.** Second, it appears that the agreement between the two reports generally increases with the age of the respondent. Although there were some persons "not affected" in 1948 who when interviewed in 1957 said they had been ill in 1948, they were too few to counteract the general tendency of 1948 study group members to understate illness during the smog episode. (The tendency to give an inconsistent report in this direction generally increases with age in both sexes.) Since we could consult the 1948 Public Health Service records, the memory failures had no effect upon our findings. Table 38 does, however, point out the effect memory failure could have on the findings of a retrospective study of an event for which contemporary information was unavailable.

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*In the 1948-49 study each person was classified as "affected" or "not affected" by the smog episode on the basis of replies to several questions including the phrases "affected by smog" and "how many days ill" among others. The exact phrasing of these questions used by the interviewers at that time is not known. The question asked of each respondent in the present investigation was "Did you become ill during the smog episode in October, 1948?" The comparison in Table 38 does not, therefore, measure only memory failure but also possibly some distinction betwe "affected" and "ill" in the mind of the respondent. Nevertheless, the results would seem to indicate that memory failure is largely responsible for the discrepancies noted in the table.

**This is further illustration of the general tendency of persons to understate previous illness mentioned on page 4 of this report.

TABLE 38. PER CENT OF PERSONS REPORTING IN 1957 THAT THEY BECAME ILL DURING THE 1948 SMOG EPISODE BY AGE, SEX, AND "DEGREE OF AFFECTION" AS REPORTED IN 1948

(Personally Interviewed Persons Only)

Age in 1948	Male					Female				
	Reported "not affected" in 1948	Reported "affected" in 1948				Reported "not affected" in 1948	Reported "affected" in 1948			
		Mild	Moderate	Severe	Total		Mild	Moderate	Severe	Total
19 or less	7	29	29	45	30	7	17	33	29	26
20-34	10	18	30	65	31	7	21	34	53	31
35-49	10	16	34	70	33	14	20	40	58	37
50-65	8	33	49	79	54	14	--	44	81	45
65 or older	13	33	36	100	53	23	--	40	50	39
Total	9	24	37	73	39	10	16	38	61	35

In the body of this report attention has been called to the influence of sampling variation on particular comparisons of interest. The appropriate methods for assessing this possible influence were not discussed in these instances, however. If the problem is viewed simply as one of generalization from either the 1948 sample to the total population of Donora or generalization from the 1957 sample to all residents of the Borough at the corresponding data, the methods required are straight-forward and relatively simple.

Ignoring the fact that persons were selected in clusters called households following a systematic scheme of every third household in both 1948 and 1957, both samples may be treated as simple random samples of persons. This assumption is likely to do little violence to the validity of the methods of assessing the influence of sampling variation. For simple random samples the rates, means, and totals estimated from the sample for the entire Donora population will have standard deviations given by the formula

$$\frac{N - n}{N} \quad \frac{\sigma^2}{n} = 2/3 \quad \frac{\sigma^2}{4092}$$

where σ^2 is the appropriate population variance. Estimates of these variances may be computed from the sample values using the usual formula for the square of the sample standard deviation.

Comparisons between subgroups within the population technically require that the number of sample persons falling in each sub group be treated as a random variable, itself subject to variation from sample to sample. The correct formulae for the variances and sample estimates may be found in standard texts, e.g., Sampling Techniques by W. G. Cochran.

Section III

BASIC TABULATIONS

TABLE 39. NUMBER OF PERSONS REPORTING ILLNESS DURING THE SMOG EPISODE BY SEX AND AGE

Donora Residents, USPHS Study, 1948

Age 1948	Males						Females					
	Not Ill	Ill				Total	Not Ill	Ill				Total
		Total Ill	Mild	Moderate	Severe			Total Ill	Mild	Moderate	Severe	
19	534	149	77	57	15	683	438	138	58	71	9	576
20-34	314	177	40	117	20	491	330	215	76	120	19	545
35-44	131	138	34	91	13	269	138	131	43	63	25	269
45-54	106	155	31	93	31	261	113	129	35	71	23	242
55-64	117	164	18	99	47	281	91	113	13	68	32	204
65	62	82	9	42	31	144	58	69	8	32	29	127
Total	1264	865	209	499	157	2129	1168	795	233	425	137	1963

TABLE 40 A. MORTALITY OCTOBER 30, 1948 - APRIL 30, 1957 AMONG DONORA RESIDENTS USPHS STUDY 1948 BY CAUSE OF DEATH FOR PERSONS OF INDICATED SEX, AGE, AND ILLNESS STATUS

Cause of Death(a)	Not Ill Males				Not Ill Females			
	Total All Ages	Age			Total All Ages	Age		
		<45	45-64	65+		<45	45-64	65+
450	1			1	1	-	-	1
420	11		9	2	15	1	7	7
410-416	-	-	-	-	1	-	1	-
421-422	8		2	6	7	-	1	6
440-443	3		1	2	3	-	1	2
430-434	2		1	1	1	-	-	1
444-447	-	-	-	-	-	-	-	-
590-594	1		1	-	1	-	-	1
330-334	13		5	8	7	-	4	3
780-2, 400-2, 451-468	2		2	-	1	1	-	-
800-985	3	1	1	1	1	-	-	1
581	1	1	-	-	-	-	-	-
260	-	-	-	-	1	-	1	-
140-205	14	1	7	6	12	5	5	2
480-493	1		-	1	-	-	-	-
001-019	-	-	-	-	-	-	-	-
500-502	-	-	-	-	-	-	-	-
All Other	8	2	4	2	6	1	4	1
Unknown	1	-	1	-	1	-	1	-
Total(b)	69	5	34	30	58	8	25	25

(a) Code numbers, Manual of the International Statistical Classification of Disease, Injuries, and Causes of Death, Sixth Revision.

(b) Two deaths during April, 1957 omitted.

TABLE 40B. (CONTINUED)

ILL MALES

Cause of Death(a)	Total Ill				Mild				Moderate				Severe				Totals			
	Total	Age			Total	Age			Total	Age			Total	Age			Total	Age		
	All Ages	45	45-64	65	All Ages	45	45-64	65	All Ages	45	45-64	65	All Ages	45	45-64	65	All Ages	45	45-64	65
450																	1	-	-	1
420	31	3	16	12	2		1	1	19	2	11	6	10	1	4	5	42	3	25	14
410-416	1	-	-	1					-	-	-	-	1	-	-	1	1	-	-	1
421-422	11	-	4	7					3	-	-	3	8	-	4	4	19	-	6	13
440-443	6	-	-	6					3	-	-	3	3	-	-	3	9	-	1	8
430-434	2		1	1									2	-	1	1	4	-	2	2
444-447	-	-	-	-									-	-	-	-	-	-	-	-
590-594	1	-	1	-									1	-	1	-	2	-	2	-
330-334	10	-	4	6					8	-	4	4	2	-	-	2	23	-	9	14
780-2,400-2, 451-468	1	-	1	-					1	-	1	-	-	-	-	-	3	-	3	-
800-985	6	3	2	1	3	3	-	-	3	-	2	1	-	-	-	-	9	4	3	2
581	4	1	3	-	1		1		1	-	1	-	2	1	1	-	5	2	3	-
260	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
140-205	16	-	12	4	3		2	1	7	-	6	1	6	-	4	2	30	1	19	10
480-493	3	-	1	2	1	-	-	1					2		1	1	4	-	1	3
001-019	-	-	-	-									-	-	-	-	-	-	-	-
500-502	1	-	1	-									1	-	1	-	1	-	1	-
All Other	12	1	8	3					7	-	5	2	5	1	3	1	20	3	12	5
Unknown	4		3	1					2	-	2	-	2		1	1	5	-	4	1
Total(b)	109	8	57	44	10	3	4	3	54	2	32	20	45	3	21	21	178	13	91	74

(a) Code numbers, Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death, Sixth Revision.

(b) Two deaths during April, 1957 omitted.

TABLE 40C (CONTINUED)

ILL FEMALES

Cause of Death	Total Ill				Mild				Moderate				Severe				Totals			
	Total All Ages	Age			Total All Ages	Age			Total All Ages	Age			Total All Ages	Age			Total All Ages	Age		
		45	45-64	65		45	45-64	65		45	45-64	65		45	45-64	65		45	45-64	65
450	-	-	-	-													1	-	-	1
420	18	2	9	7	2	-	2	-	9	1	5	3	7	1	2	4	33	3	16	15
410-416	3	2	1	-					3	2	1	-	-	-	-	-	4	2	2	-
421-422	7		4	3					7	-	4	3					14		5	9
440-443	4	1	2	1					1	1	-	-	3	-	2	1	7	1	3	3
430-434	3		1	2					1	-	-	1	2	-	1	1	4		1	3
444-447	1	1	-	-					1	1	-	-	-				1	1	-	-
590-594	3		1	2	2	-	1	1	1	-	-	1	-				4		1	3
330-334	8	2	1	5	2	1	1	-	1	-	-	1	5	1	-	4	15	2	5	8
780-2,400-2, 451-468	1	-	-	1					1	-	-	1					2	1	-	1
800-985	2	1		1					1	1	-	-	1	-	-	1	3	1	-	2
581	2	2	-	-					1	1	-	-	1	1	-	-	2	2	-	-
260	2		1	1					1	-	1	-	1	-	-	1	3	-	2	1
140-205	14	2	6	6	5	2	3	1	4	-	2	2	5		2	3	26	7	11	8
480-493	-	-	-	-					-	-	-	-	-	-	-	-	-	-	-	-
001-019	2	1	1	-					1	1	-	-	1	-	1	-	2	1	1	-
500-502	-	-	-	-					-	-	-	-	-	-	-	-	-	-	-	-
All Other	7	2	4	1	1	-	1	-	4	2	1	1	2	-	2	-	13	3	8	2
Unknown	1		-	1					1	-	-	1	-	-	-	-	2	-	1	1
Total	78	16	31	31	12	3	7	2	38	10	14	14	28	3	10	15	136	24	56	57

TABLE 41. MORTALITY OCTOBER 30, 1948 - APRIL 30, 1957 AMONG DONORA RESIDENTS USPHS STUDY 1948 BY YEAR OF DEATH, AGE, SEX, AND ILLNESS STATUS

Age in 1948	6				6-19				20-34				35-44				45-54				55-64				65				Total			
Illness Status	Ill		Not Ill		Ill		Not Ill		Ill		Not Ill		Ill		Not Ill		Ill		Not Ill		Ill		Not Ill		Ill		Not Ill		Ill		Not Ill	
Sex	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Year of Death																																
10/48-11/49			1						1						1	1	1			2	2	2	2	1	8	5	4		12	7	8	4
10/49-11/50										2				3		1	3	5			4	4	2	1	4	2	4	4	11	16	6	6
10/50-11/51									1	1	1			3			2				7	2	2	1	10	1	3	2	20	7	6	3
10/51-11/52									1		1					1					7	4	3	1	4	7	6	2	12	11	10	4
10/52-11/53										1				1			3	3	5	2	5	3	4	1	5	1	2	4	13	9	11	7
10/53-11/54		1							1					2			1	2	2	2	3	2	1	4	4	7	5	5	9	14	8	11
10/54-11/55									1			1	1			2	1		4	2	10	1	2	2	6	5	2	4	19	6	8	11
10/55-11/56							1	1	1				1	2			2		1	2	5	2	3	3	2	3	3	2	11	7	8	8
10/56-5/57												1				1			1		1	1	2	1	1		2	2	2	1	5	5
Total(a)		1	1				1	1	6	4	2	2	2	11	1	6	13	10	13	10	44	21	21	15	44	31	31	25	109	78	70	59

(a) The four deaths estimated to have occurred among the forty-one persons lost to follow-up are not included. Total deaths, 316 + 4 = 320.

TABLE 42. NUMBER OF PERSONS REPORTING ONE OR MORE CHRONIC DISEASES* BY AGE, SEX, AND ILLNESS STATUS

(Interviewed Persons - 1957)

Age 1948	Male		Female	
	Ill	Not Ill	Ill	Not Ill
Under 20	16	45	20	29
20-34	35	48	46	41
35-49	54	42	66	65
50 and older	101	55	98	74
All Ages	206	190	230	209

*Interviewed persons reporting one or more chronic diseases; DISEASES INCLUDED: Rheumatism and arthritis, heart disease, rheumatic fever, high blood pressure, diabetes, chronic bronchitis, chronic sinus trouble, asthma, kidney trouble, hardening of the arteries, hernia-rupture.

TABLE 43. NUMBER OF PERSONS REPORTING ONE OR MORE OF A SELECTED GROUP OF CHRONIC CONDITIONS* BY AGE, SEX, AND ILLNESS STATUS

(Interviewed Persons, 1957)

Age 1948	Male		Female	
	Ill	Not Ill	Ill	Not Ill
Under 20	13	22	14	23
20-34	21	28	34	25
35-49	29	24	46	38
50 and older	55	28	69	54
All Ages	118	102	163	140

*Includes heart disease, high blood pressure, hardening of the arteries, asthma, chronic bronchitis, chronic sinus trouble and kidney trouble.

TABLE 44. NUMBER OF PERSONS REPORTING ONE OR MORE CARDIO-VASCULAR AND RESPIRATORY SYMPTOMS* BY AGE, SEX, AND ILLNESS STATUS

(Interviewed Persons - 1957)

Age 1948	Male		Female	
	Ill	Not Ill	Ill	Not Ill
Under 20	5	25	15	23
20-34	23	36	51	49
35-49	31	26	54	52
50 and older	60	35	78	55
All Ages	119	122	198	187

*Personally interviewed persons reporting one or more of the cardio-vascular and respiratory symptoms listed in Appendix C.

TABLE 45. NUMBER OF PERSONS HOSPITALIZED* ONE OR MORE TIMES
SINCE OCTOBER, 1948 BY AGE, SEX, AND ILLNESS STATUS
(Interviewed Persons - 1957)

Age 1948	Male		Female	
	Ill	Not Ill	Ill	Not Ill
Under 20	31	104	50	96
20-34	41	65	52	81
35-49	56	38	72	63
50 and older	76	48	69	58
All Ages	204	255	243	298

*Exclusive of hospitalization for pregnancy and normal deliveries.

TABLE 46. NUMBER OF PERSONS DYING SINCE 1948 OR CLASSIFIED AS ILL* IN 1957 BY AGE, SEX, AND ILLNESS STATUS, 1948

(Personally Interviewed or Dead Persons)

Age 1948	Male			Female		
	Severely Ill	Ill	Not Ill	Severely Ill	Ill	Not Ill
Under 20	7	23	56	5	40	62
20-34	5	54	75	9	87	96
35-49	16	86	59	23	105	91
50 and older	70	207	135	58	173	140
All Ages	98	370	325	95	405	389

*See Text, page 31, for definition. All persons in this Table are Type S persons.

TABLE 47. NUMBER OF PERSONS REPORTING HEART DISEASE IN 1957 OR DYING FROM CARDIO-VASCULAR CAUSES SINCE 1948 AMONG PERSONS NOT REPORTING HEART DISEASE IN 1948, BY AGE AND ILLNESS STATUS

A. MALES

No Heart Disease in 1948	(1) H. D. in 57	(2) Died of H. D.	(3) Died of Non H.D.	(1) + (2)	(4) Alive, No H.D. 57	(5) No Information	Total (1) through (5)	Total less (5)
				Not Ill				
Age								
Under 20	-	-	2	-	464	66	532	466
20-34	3	-	2	3	275	33	313	280
35-49	3	1	4	4	168	9	185	176
50-64	6	13	15	19	114	13	162	148
65 and older	1	9	19	10	29	2	60	58
Total	13	23	42	36	1050	123	1251	1128
				Ill				
Under 20	2	-	-	2	131	14	147	133
20-34	2	1	3	3	150	16	172	156
35-49	4	4	7	8	185	17	217	200
50-64	14	15	23	29	157	10	219	209
65 and older	3	22	12	25	30	5	72	67
Total	25	42	45	67	653	62	827	765

TABLE 47. (CONTINUED)

B. FEMALES

No Heart Disease in 1948	Not Ill							
	(1) H. D. in 57	(2) Died of H.D.	(3) Died of Non H.D.	(1) + (2)	(4) Alive, No H.D. 57	(5) No Information	Total (1) - (5)	Total less (5)
Age								
Under 20	3	1	0	4	403	30	437	407
20-34	2	1	1	3	302	22	328	306
35-49	6	1	5	7	167	9	188	179
50-64	9	8	11	17	115	3	146	143
65 and older	3	13	8	16	24	3	51	48
Unknown	1			1	1	-	2	
Total	24	24	25	48	1012	67	1152	1085

	Ill							
Under 20	2	-	1	2	126	6	135	129
20-34	1	1	1	2	196	8	207	199
35-49	6	2	8	8	145	18	179	161
50-64	7	11	10	18	120	5	153	148
65 and older	3	11	16	14	24	7	61	54
Total	19	25	36	44	611	44	735	691

TABLE 48. NUMBER OF PERSONS INTERVIEWED CONCERNING CHRONIC CONDITIONS, 1957 FROM THE USPHS SAMPLE OF THE 1948 DONORA POPULATION BY AGE, SEX, AND ILLNESS STATUS
(Personal and mail Interviews)

Age 1948	Male		Female	
	Ill	Not Ill	Ill	Not Ill
Under 20	135	466	407	130
20-34	156	279	306	202
35-49	192	172	179	167
50 and older	216	153	155	172
All Ages	699	1070	1047	671

TABLE 40. NUMBER OF PERSONS REPORTING VARIOUS DISEASE CONDITIONS IN 1957 FROM THE USPHS SAMPLE OF THE 1948 DONORA POPULATION; BY AGE AND SEX

(Interviewed Persons)

1957 Age	Asthma			Diabetes			Hardening of Arteries			High Blood Pressure			Heart Disease			Rheumatism and Arthritis		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
0-14	2	1	3	-	-	-	-	-	-	-	-	-	1	1	2	-	1	1
5-24	3	2	5	-	1	1	-	1	1	1	-	1	-	3	3	3	4	7
5-34	4	4	8	-	-	-	-	1	1	6	4	10	1	3	4	8	9	17
5-44	3	5	8	-	1	1	-	1	1	5	6	11	7	4	11	18	20	38
5-54	6	5	11	4	5	9	-	2	2	5	20	25	6	17	23	22	47	69
5-64	6	2	8	3	11	14	4	1	5	15	37	52	11	11	22	44	49	93
65+	12	9	21	9	19	28	11	13	24	10	48	58	20	21	41	46	51	97
nknown	1	3	4	2	1	3	-	1	1	3	3	6	1	3	4	5	9	14
Total	37	31	68	18	38	56	15	20	35	45	118	163	47	63	110	146	190	336

1957 Age	Rheumatic Fever			Kidney			Hernia			Chronic Bronchitis			Chronic Sinus		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
0-14	2	2	4	-	2	2	3	1	4	3	1	4	4	4	8
15-24	6	-	6	-	4	4	3	1	4	-	-	-	7	7	14
25-34	3	2	5	1	4	5	7	1	8	1	2	3	17	19	36
35-44	-	3	3	6	1	7	8	2	10	2	4	6	13	19	32
45-54	-	2	2	3	4	7	9	-	9	6	4	10	15	19	34
55-64	3	-	3	4	8	12	13	1	14	9	5	14	7	9	16
65+	-	1	1	5	7	12	15	7	22	5	5	10	3	6	9
Unknown	-	2	2	1	3	4	5	-	5	2	2	4	9	10	19
Total	14	12	26	20	33	53	63	13	76	28	23	51	75	93	168

TABLE 50. NUMBER OF PERSONS INTERVIEWED CONCERNING CHRONIC DISEASE IN 1957 FROM THE USPHS SAMPLE OF THE 1948 DONORA POPULATION, BY AGE, AND SEX

1957 Age	Personal and Mail Interviews		
	Males	Females	Total
0-14	243	208	451
15-24	216	198	414
25-34	254	272	526
35-44	283	327	610
45-54	225	226	451
55-64	208	193	401
65+	226	189	415
Unknown	114	105	219
Total	1769	1718	3487

TABLE 51. NUMBER OF PERSONS REPORTING VARIOUS DISEASE CONDITIONS FROM THE ONE-THIRD SAMPLE OF THE 1957 RESIDENTS OF DONORA; BY AGE AND SEX

1957 Age	Asthma			Diabetes			Hardening of The Arteries			High Blood Pressure			Heart Disease			Rheumatism and Arthritis		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
0-14	4	3	7	-	-	-	-	-	-	-	-	-	1	2	3	3	3	6
15-24	2	1	3	1	2	3	-	-	-	-	-	-	-	2	2	1	1	2
25-34	5	2	7	-	-	-	-	-	-	-	1	1	-	5	5	7	13	20
35-44	3	1	4	1	1	2	-	-	-	5	5	10	-	3	3	9	27	36
45-54	2	1	3	3	1	4	2		2	3	14	17	4	4	8	19	42	61
55-64	5	-	5	-	9	9	1	2	3	9	16	25	10	10	20	40	41	81
65+	7	3	10	6	6	12	-	-	-	3	18	21	14	8	22	29	41	70
Unknown	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	28	11	39	11	19	30	3	2	5	20	54	74	29	34	63	108	168	276

	Rheumatic Fever			Kidney			Hernia			Chronic Bronchitis			Chronic Sinus		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
0-14	2	1	3	-	1	1	4	1	5	4	1	5	4	2	6
15-24	1	1	2	-	4	4	-	2	2	-	1	1	3	5	8
25-34	1	2	3	2	3	5	2	3	5	-	1	1	13	17	30
35-44	1	1	2	1	3	4	3	1	4	2	2	4	9	9	18
45-54	-	-	-	-	1	1	2	1	3	3	2	5	9	6	15
55-64	1	1	2	2	1	3	5	-	5	-	4	4	6	-	6
65+	-	-	-	2	3	5	9	3	12	1	-	1	1	1	2
Unknown	-	-	-	-	-	-	3	3	6	-	-	-	-	-	-
Total	6	6	12	7	16	23	28	14	42	10	11	21	45	40	85

TABLE 52. NUMBER OF PERSONS INTERVIEWED CONCERNING CHRONIC DISEASE ONE-THIRD SAMPLE OF THE 1957 RESIDENTS OF DONORA, BY AGE AND SEX

1957 Age	Personal Interview 1957 Sample		
	Males	Females	Total
0-14	470	462	932
15-24	157	206	363
25-34	253	268	521
35-44	243	278	521
45-54	193	180	373
55-64	191	179	370
65+	166	153	319
Unknown	---	2	2
Total	1673	1728	3401

TABLE 53. NUMBER OF PERSONS REPORTING VARIOUS CHRONIC CONDITIONS, BUTLER COUNTY HEALTH STUDY, 1954, BY AGE AND SEX

Age	Asthma			Diabetes			Hardening of the Arteries			High Blood Pressure			Heart Disease		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
0-14	5	15	20	-	-	-	-	-	-	-	-	-	2	4	6
15-24	1	4	5	2	-	2	-	-	-	3	1	4	4	-	4
25-34	4	1	5	-	3	3	1	-	1	6	4	10	6	3	9
35-44	5	3	8	2	-	2	1	-	1	4	11	15	5	3	8
45-54	4	3	7	1	2	3	-	3	3	6	15	21	7	13	20
55-64	8	7	15	-	8	8	2	5	7	4	25	29	4	10	14
65+	5	5	10	5	11	16	10	12	22	12	38	50	8	25	33
Unknown	-	-	-	-	-	-	-	2	2	-	2	2	-	1	1
Total	32	38	70	10	24	34	14	22	36	35	96	131	36	59	95

Age	Rheumatism Arthritis			Rheumatic Fever			Kidney Trouble			Hernia		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
0-14	-	-	-	6	2	8	1	3	4	13	-	13
15-24	-	3	3	1	2	3	1	2	3	1	-	1
25-34	8	8	16	4	4	8	3	3	6	4	1	5
35-44	9	21	30	-	4	4	2	5	7	20	2	22
45-54	13	23	36	1	-	1	1	3	4	9	1	10
55-64	18	29	47	-	-	-	2	3	5	16	1	17
65+	37	52	89	-	3	3	4	9	13	25	6	31
Unknown	-	2	2	-	-	-	-	-	-	--	-	--
Total	85	138	223	12	15	27	14	28	42	88	11	99

TABLE 54. NUMBER OF PERSONS INTERVIEWED CONCERNING CHRONIC DISEASE IN SURVEY II, ARSENAL HEALTH DISTRICT, PITTSBURGH, 1952 AND BUTLER COUNTY, PENNSYLVANIA 1954

Age	Male		Female		Total	
	Arsenal	Butler	Arsenal	Butler	Arsenal	Butler
0-14	1158	501	1110	549	2268	1050
15-24	681	179	644	229	1325	408
25-34	688	222	766	245	1454	467
35-44	683	230	960	248	1443	478
45-54	544	187	586	178	1130	365
55-64	451	138	457	142	908	280
65+	331	174	394	165	725	339
Unknown	54	2	89	14	143	16
Total	4590	1633	4806	1770	9396	3404

TABLE 55. NUMBER OF PERSONS REPORTING VARIOUS CHRONIC CONDITIONS, SURVEY II, ARSENAL HEALTH DISTRICT, PITTSBURGH, 1952, BY AGE AND SEX

Age	Asthma			Diabetes			Hardening of Arteries			High Blood Pressure			Heart Disease			Rheumatism and Arthritis		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
0-14	7	7	14	1	2	3	1	-	1	-	-	-	18	4	22	1	1	2
15-24	5	3	8	2	-	2	-	-	-	3	5	8	6	9	15	3	8	11
25-34	-	9	9	-	3	3	-	1	1	-	9	9	1	7	8	4	17	21
35-44	25	6	31	2	8	10	-	2	2	15	27	42	10	16	26	25	54	79
45-54	5	5	10	5	5	10	1	2	3	7	44	51	16	17	33	26	71	97
55-64	10	12	22	5	19	24	6	6	12	19	54	73	29	25	54	41	72	113
65+	8	16	24	11	19	30	15	20	35	29	68	97	20	36	56	57	104	161
Unknown	-	-	-	2	-	2	-	2	2	2	5	7	-	3	3	2	5	7
Total	60	58	118	28	56	84	23	33	56	75	212	287	100	117	217	159	332	491

PROSPECTUS FOR
THE
DONORA HEALTH STUDY

PROSPECTUS FOR THE DONORA HEALTH STUDY

I. Introduction

During the Summer of 1955 the U.S.Public Health Service initiated conversations concerning the need for community studies to assess the effects of air pollution on the health of the population. As these discussions progressed it seemed appropriate to begin such a program by a resurvey of Donora, Pennsylvania. In 1948 Donora had been subjected to a smog episode of several days duration during which a number of persons had died. Following this episode the U. S. Public Health Service had conducted a survey to determine who had been affected by the episode. An estimated 5,910 persons of the 13,839 persons residing in Donora had been affected. It was felt that a study of this population undertaken now, eight years later, could throw some light on the long term effects of air pollution. A contract to carry out such a study was signed by the Graduate School of Public Health, University of Pittsburgh in September, 1956.

The following paragraphs cover the present plans for the Donora investigation in some detail. The plans have been developed to meet the stated objectives of the study from information and experience gained in health studies conducted in many parts of the United States. It is well to record at the outset, however, that the Donora study by its very nature poses special problems concerning which only limited information and experience are available. Some of these problems are methodological relating to the longitudinal nature of the investigation, and others are non-statistical relating to the specific public relations problems unique to Donora.

The portions of this plan which are sensitive to changes in our current conception of the influence of the factors alluded to may well be modified as the study progresses. As of this date, from limited conversations with responsible leaders of the Donora community the proposals which follow seem feasible.

II. Objectives:

A. The principal objective of the study will be to contrast the health status during the past eight years of the group of persons adversely affected at the time of the smog episode with that of the group not thus affected. Various measurements will be utilized in these comparisons:

(1) differential mortality during the entire eight year period in the two groups, both in terms of rates and cause of death.

(2) verifiable reports of morbidity during all or part of the past eight years.

(3) individual reports of present symptoms possibly related to cardio-respiratory conditions.

(4) individual reports of various types of disablement.

To sharpen these contrasts we will wish to obtain the following information for classification of the persons in the two groups:

(5) the usual demographic data; age, sex, race, marital status, etc.

(6) certain socio-economic data; education, occupation.

(7) enough of an occupational history to provide for at least rough classification into type of labor performed and place of work.

(8) a residence history sufficient to measure years of residence in the Monongahela Valley.

(9) Smoking history - to consider the possible effects of the additional insult to the respiratory system.

B. Several secondary objectives can be listed:

(1) To characterize certain aspects of the health status of all January, 1957 residents of the Borough, for comparison with similar measurements made in other communities.

(2) To seek to develop measures or indices of health whose variation during the past eight years might be studied in relation to variation in indices of air pollution developed from existing meteorologic and pollution data.

(3) A general comparison of mortality and morbidity (from certain causes) of Donora's residents during part or all of the past eight years with the corresponding measures in other communities.

C. The study includes various features which fall in the area of research in methodology. Problems arising in the collection and analysis of longitudinal data from a population group which resided in Donora in October, 1948 but has since been dispersed spatially and reduced in size by death will be investigated. Investigation will be made of the availability and utility of data obtained from non-household sources (physicians, hospitals, vital statistics) in inquiries of this type.

III. Population to be studied:

The objectives of the investigation will require that two different population groups be defined.

A. For those objectives relating to the present health status of the residents of the Borough, the universe will consist of all occupied households within the Borough's legal boundaries on the day of the survey. The planned sample to obtain this information will be a sample of occupied households, and it will permit generalization to the population of all persons resident in Donora on the day of the survey. This definition of the geographic area included for this portion of the study is clearly different from the "Donora Area" definition employed in the Public Health Service study conducted in Donora in 1948-49.

B. For those objectives relating to the comparison of the persons adversely affected during the 1948 smog episode with those persons reporting they were not affected, the investigation will be limited (with the exception noted below) to the persons whose names appear on the roster of the 1948 sample selected by the Public Health Service for which

(1) the listed address is within the corporate boundaries of the Borough of Donora and

(2) a completed interview was obtained in 1948-49.

The proposed procedure for locating and identifying persons included in the 1948 Public Health Service sample will undoubtedly turn up some 1948 sample persons whose residence during the smog episode can be roughly classed as Webster, Pennsylvania and environs. Since it is not clear which geographical area was sampled in 1948 to yield the persons

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giving addresses in this category, and since a clearly defined geographical area is a requirement of the proposed field procedure developed for the present study, it is suggested that special methods be employed to ascertain only the mortality experience of those persons interviewed in 1948 from the "Webster and environs" area.

It should be noted that residents of Carroll Township will be excluded entirely from the present investigation, unless they lived in Donora in October, 1948. The Carroll Township and Webster areas will, however, be utilized during the field testing of the schedule and during the interviewer training period.

IV. Field Procedure

Several alternative procedures for illiciting the required information have been considered. It will be convenient to first, discuss the field procedure for (1) selecting the households from which estimates of the present health status of Donora's residents will be prepared and (2) for identifying the persons resident in Donora in October, 1948 who will be questioned concerning changes in their health during the past eight years.

The address listing of the households in which the 1948 sample persons resided has been prepared and is included as Appendix A. A procedure of starting with a visit to each of these addresses in an attempt to begin the process of tracing the present residence of each of the 1948 sample persons was considered. A check of the Donora telephone directory against the 1948 sample alphabetical listing (Appendix A) revealed that 785 names matched a name in the listing, and that in 484 of these cases (62 per cent) the address also matched. The 1950 Census of Population shows that 11 per cent of Donora's residents had moved in the single year prior to the census. These facts suggest that a procedure based on starting with the 1948 addresses would be (1) administratively clumsy, (2) expensive, (3) likely difficult to control with respect to enumerator error, and (4) provide no basis for estimating the present health status of the Borough's residents.

An alternative procedure that is likely to prove no more expensive and which overcomes the other objections to beginning with the 1948 sample addresses is as follows: The Borough can be divided into 12 areas, each containing contiguous blocks, with each area having approximately equal population. The areas can also be constructed to be as internally homogeneous as possible on various social, economic, and geographical characteristics. Each area may be assigned to a single interviewer. The interviewer will be required to make a complete census of his area. This census will be designed to (1) obtain an exact count of all households within the area as of the date of the census, (2) to locate and identify all 1948 P.H.S. sample persons residing within the area, and (3) to obtain as complete information as is obtainable in Donora concerning the present residence of those 1948 sample persons who have moved from Donora since 1948.

The methods of obtaining the information concerning the 1948 P.H.S. sample persons will be covered fully in the section "Schedules" which follows. The count of occupied households will be conducted following the procedures and definitions of the U. S. Bureau of the Census. As each household is enumerated it will be entered on listing sheet 1, (Appendix B) which will constitute the frame for selection of the sample of households to furnish the information for making estimates of the current health status of the residents of the Borough. The sampling procedure will select one third of the occupied households. The selection will either be systematic from a random start or will be accomplished by a random pre-selection of lines on listing sheet 1. Recent experience with estimates of the health items included on the portion of the schedule referring to current health status would indicate that the one-third sampling rate will result in moderate relative sampling errors - of the order of 5%, to 20% for most estimates of interest. Detailed age-sex specific rates will be less precisely estimated, but the suggested rate seems adequate for the purposes stated in the objectives.

The interviewers will be required to submit their work daily for review and field editing. The information obtained about the current addresses of 1948 sample persons will be posted daily to a master file of the 1948 sample (Appendix C). At the completion of the interviewing this file will then contain the information upon which the decisions concerning the next step in the follow-up will be based.

During the interview all 1948 sample persons who give reports of cardiac disease, respiratory disease, or symptoms frequently associated with these diseases for which they have consulted a doctor, or have been hospitalized will be asked to sign a medical record release form (Appendix D). This signed form will permit the selective investigation of a number of conditions for particular periods of time in a manner to be determined at a later date. It will also provide a mechanism for verifying the household report of a number of conditions.

A rule that any responsible adult household member may answer the questions on the census portion of the schedule (Items 20-31) will be established. All adults to be further interviewed (Items 32-47) who are at home at the time of the call on the household will be individually interviewed. The questions concerning those adults not at home and those relating to children will be again asked of any responsible adult person found at home at the time of the call.

If no one is found at home after three optionally timed calls, the census information will be obtained from a neighbor and the case referred to the field supervisor for decision concerning the respondent for the remaining portions of the interview (if any).

The population of the Borough is estimated at approximately 12,000. Estimating 10 minutes as the time required to census one household and thirty minutes to complete an interview in those households requiring an interview, the field work can be completed by the twelve interviewers in from five to six weeks, barring poor weather complications.

V. Schedules:

A draft of the proposed household schedule is appended. It may be noted that an attempt has been made to design a single schedule that will permit the interviewer to:

(1) record the census information for each household and terminate the interview (Items 20-31) or

(2) record the census information, interview the household concerning present health status and terminate the interview (Items 20-42) or

(3) record the census information, obtain the current health status information, and then obtain the health facts for each 1948 sample person residing in the household (Items 20-47).

Such a form will materially simplify the field work for the interviewers. The health questions involve the use of a card (specimen appended) to be handed to the respondent upon which are listed the chronic conditions, the disability status, and the symptoms which are of interest in this study. The interviewer records on the schedule only the alphabetical designation of the item on the card by circling an appropriate entry on the schedule.

A detailed explanation of the intent and purpose of each question, together with instructions to the interviewers concerning each question may be found in the appended Manual of Instructions for Interviewers. This manual also includes the definitions of all terms pertinent to the study, as well as other material required during the interviewer training period, the field testing, and actual conduct of the study.

For 1948 sample persons reporting hospitalizations, doctor's visits, or other sources of medical information which may be of benefit as source material later in the study, a medical information release blank will be routinely requested. These forms will be accomplished at the completion of the interview and the signature of the appropriate person requested.

VI. Follow-Up of 1948 sample persons no longer resident in Donora.

The details of the planning for this phase of the study cannot be specified until the size of the group to be followed has been ascertained. The specific procedures to be instituted will also depend upon the geographical dispersion of this group.

In general, an attempt will be made to obtain the same information for all or a sample of the persons in this group as will be obtained for those 1948 sample persons still resident in Donora. Several procedures may have to be used. For those persons residing in close proximity to Donora a personal interview by one of the study interviewers may be feasible. In certain other localities a personal interview may be possible utilizing the resources of local health departments. In some instances we may have to resort to a mailed questionnaire. The mailed questionnaire will be a modified version of that used for personal interview covering the same questions but in an abbreviated and simplified form.

The information obtained in items 20 through 31 of the schedule appended should provide the required addresses to organize the follow-up procedure. Again, dependent upon the results obtained, it may be necessary to supplement the schedule address information from other sources. The post office may be the most useful of these other sources.

VII. Mortality Records

Our planning for the collection of the death certificates for all 1948 sample persons who have since died can be stated in more concrete terms than other plans for follow-up. The Pennsylvania State Health Department will be requested to furnish a listing of the names of all persons who died in Donora (or for which Donora was listed as the residence address) for the period October 1948 to February 1957. This listing will be checked against the alphabetical listing of the 1948 Public Health Service sample. A copy of the death certificate for each name matched will be requested. Presumably this process will provide the death certificates for a high proportion of the deaths of 1948 sample persons.

However, as an independent source of mortality information items 30 and 31 of the appended schedule should prove useful. These items will also give information concerning deaths of 1948 sample persons which occurred elsewhere in the state or in other states or countries. Information concerning the circumstances of death for each such report will be sought through the appropriate state or local vital statistician. By these means it is hoped that a copy of the death certificates will be obtained for each 1948 sample person who has since died.

VIII. Preparation for field work.

A. Public Information

A health study in Donora poses special problems in public relations. To acquaint the community of our purposes and plans several steps will be taken. Following initial contacts with the responsible Borough, management, union, and medical officials of the community, a meeting of leaders of all the educational, professional, civic, religious and fraternal groups is planned. At this meeting the plans for the study will be discussed and the active support of each group represented will be sollicited.

Simultaneously with this meeting the residents of the community will be informed of the plans through a news story released through the Donora Herald American, and, perhaps, other

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Monongahela Valley newspapers. Subsequently, this initial announcement will be supplemented by announcements via radio, television, and other local media. A public information specialist who has assisted the Department in several other health surveys will be employed to organize and direct these activities.

B. Interviewer Training and Schedule Testing

The interviewers to be employed on the study will be recruited in Donora. Previous experience suggests that mature housewives with limited household responsibilities be employed. However, local conditions and availability may influence the selection of the interviewers for this study.

A training period of one week will be given to the prospective interviewers to instruct them in the procedures to be used and to test their ability to perform the work in the field. The last two days of the training period will be devoted to the final field testing of the schedule, and census and sampling procedures. The work of each interviewer will be reviewed to judge her competence and to eliminate sources of error in schedules and procedure which become apparent.

IX. Coding, Tabulation, and Analysis

Coding and tabulation plans will be developed as the study progresses. Tabulations for the contemplated analysis will be done on International Business Machine equipment of the Department. The principal analyses that are presently contemplated from the household durvey can be listed as follows:

(1) Chronic illness and symptoms prevalence rates for Donora, 1957, by:

  (a) age, sex, and possibly race,
  (b) place of birth in broad categories and age,
  (c) length of residence in Donora, in the Monongahela Valley, in Western Pennsylvania, by age and sex,
  (d) place of work, sex, and age,
  (e) occupation sex and age,
  (f) duration of employment at particular places by sex and age,
  (g) duration of employment in particular occupations by sex and age,
  (h) smoking history and age and sex,
  (i) medical care sought for the illness or symptom.

(2) Total illness and total symptoms prevalence rates for the affected and not affected 1948 sample persons by age and sex.

(3) Medical care, morbidity from selected causes, and mortality during the period October, 1948 to present for the two subgroups of the 1948 sample by:

   (a) severity of manifestations in 1948 (PHS survey),
   (b) reported chronic disease status in 1948 (PHS survey),
   (c) residence history prior and subsequent to October, 1948,
   (d) occupational history prior and subsequent to October 1948,
   (e) smoking history,

   all by age and sex.

(4) Reported incidence of selected conditions during the period October 1948 to present within the two sub-groups of the 1948 sample by age and sex and as many of the other variables as feasible considering the size of the groups involved.

(5) Analysis of the time sequence of reported onset of specific conditions in the two sub-groups of the 1948 sample.

Additional analyses of various types which utilize data from non-household sources will be undertaken. The analysis in this category which would appear to be the most interesting will be the detailed study of the mortality experience of the two study groups. Rough calculations indicate that 300-350 persons from the 1948 sample have died in the interim. Age-sex specific mortality rates will be compared in the two groups as well as mortality by cause. This analysis will be developed longitudinally perhaps in a modified "life table" form to see whether mortality experience in the two groups has shown a changing relation through time since the 1948 episode.

If our efforts to obtain hospitalization records are successful, a somewhat similar morbidity analysis will be possible. In addition, under the most favorable circumstances, it may be possible to attempt to relate variation in certain measures of health which can be dated (such as is possible retrospectively with mortality and morbidity requiring hospitalization) with variation in measures of air pollution constructed from available meteorologic and pollution data for the past eight years. This portion of the analysis would clearly be experimental in nature. At this stage of development such an analysis would have to be justified on grounds of methodological research.

In conclusion, it should be clearly understood that all of the study population has been exposed in varying degrees to whatever air pollution has existed in their environment. It would be most difficult, if not impossible, to differentiate between persons with varying degrees and kinds of exposure and thus be in a position to assess the effects of exposure. The point of this study, however, is another. The persons included in the 1948 sample reported varying degrees of acute reaction to the episode at that time. We hope to estimate the extent to which the acute reaction, as reported in 1948, is indicative of or may have a bearing on subsequent health.

DONORA HEALTH STUDY

INTERVIEWER'S MANUAL

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Part I. Description of the Study

A. General Purpose

The general purposes of this study are to obtain information on (1) the health of the present residents of Donora and (2) changes in the health of persons included in the 1948-49 U. S. Public Health Service study which have occured during the past eight years. For the first purpose, Donora is the fourth Western Pennsylvania community to be included in a series of studies conducted by the Graduate School of Public Health of the University of Pittsburgh. All of these studies are directed at determining the frequency of occurrence of chronic diseases and disabling conditions in an entire community. In the past, information of this kind has been available only on an incomplete basis from special studies of medical and hospital records. In recent years several communities in the United States (in addition to those in this series) have had their health status studied by the methods to be used in this study. Many more such studies will undoubtedly be undertaken in the future in our attempts to understand how these chronic diseases develop and to assess their impact on a community in terms of disability and hardship. The second purpose is related to the first. In 1948-49, following the unfortunate smog episode, the U. S. Public Health Service made an intensive study of the health of Donora's residents. The statistical information obtained on the group of persons included in the 1948-49 study will make possible comparisons of the health status today with the 1948-49 picture. By locating all the persons included in the 1949 tabulations and questioning them concerning their current health status, changes in health which have occurred in the intervening eight years will become apparent. Opportunities for measuring changes that have occured in the health of an entire community over a period of eight years are rare. This is the principal reason that the present study is of such interest.

B. Confidentiality

All the information concerning a specific person obtained in this study will be accorded confidential treatment by the Graduate School of Public Health of the University of Pittsburgh. At the conclusion of the study statistical analyses that preserve the anonimity of individual reports may be published. Individual reports will be seen, however, only by technical personnel authorized by the University to make the statistical analyses.

C. General Plan

The work to be accomplished by the interviewers can be described under three headings, despite the fact that all three procedures will proceed simultaneously. The three headings are:

(1) Census of Donora
(2) Household Sample, Donora 1957
(3) Follow-up of 1948 USPHS sample persons.

The details of each of these procedures will be covered in Part II of this manual. A brief description of each is as follows:

(1) Census of Donora: To provide current information on the names of every resident of the Borough of Donora you will be asked to make a complete count of every person who resides in an area of Donora assigned to you. The name and other personal characteristics of each person will be recorded on the study schedule and one such schedule will be obtained for each household in your area. Additional health information will be obtained in certain households described later.

The census will be conducted by households to provide a list from which a sample of households may be selected in which interviews about the current health of the household members will be made. In addition, the census provides for obtaining the present names and addresses of persons who were included in the 1948-49 Public Health Service study. The rules for conducting a population census will be the same as those employed by the U.S.Bureau of the Census.

(2) Household Sample, Donora 1957: The current health status of all residents of the Borough will be characterized by asking questions concerning health in one third of all the households enumerated in the census. The procedure by which you will select the households in your area in which to ask the health questions is described in Part II.

(3) Follow-up of 1948-49 USPHS sample persons: During the census of the households in your area you will record the names of many persons who were included in the 1948-49 study. The listing of these persons both alphabetically by name and by street address of their 1948 residence is included in the materials given to you. Whenever such a person is identified you will be required to interview him concerning his health using additional health questions to those required in a 1957 sample household.

In addition to the data which you will obtain during your interviewing certain information will be requested from hospitals and physicians.

Attempts will be made to trace those persons from the 1948-49 study who have moved from Donora in the interim and to obtain certain facts concerning their health. Since this phase of the study will be only incidental to your work it will not be described in detail in this manual.

PART II. Field Procedure

A. The Listing Procedure

1. **Beginning your work:**

Each interviewer will be assigned an area of Donora in which she will work. The area will consist of a group of contiguous blocks A map showing the boundaries of your area together with the pattern of streets and alleys within the area will be given to you You will begin your work in the block in the lower left hand corner of your map. Complete the procedures to be described in what follows in that block. Then go to an adjacent block and begin the within block listing procedure there, working systematically in a serpentine order through every block in your area.

2. **Within Block Listing procedure:**

In each block go to the south east corner of the block. Working in a counter clockwise direction sketch in the location of each structure contraining dwelling units (defined later) which has an entrace fronting on the street or alley you are working. If the structure has entrances fronting on two or more different streets or alleys associate it with the street or alley where an entrance is first encountered. Number the structure on your sketch serially beginning with 1. The structure will be referred to as the listing unit. It may be a private one family home, a duplex, an apartment buil ing, a store with living quarters in the rear or above, a house trailer, a garage, or any other kind of building provided it contains one or more dwelling units.

Enter the number assigned to each structu serially in column (2) on the Listing Sheet, Enter your name in the space provided at the top of the sheet, the date or dates when the work was done, and number the Listing Sheets in the order you use them beginning with 1. The area designation can be obtained from your supervisor and will be entered in the space provided. In column (3) of the Listing Sheet record the address of the structure. In some cases two or more addresses may be included in a single structure. When this occurs record all the addresses and clearly indicate which address is the address for each occupied household (Col. 6). After you have determined the number of dwelling units in each structure following the rules in Part II-C, record the number that are occupied and the number not occupied in columns 4 and 5, respectively. In column 6 assign numbers serially to every occupied household identified, listing households in multiple dwelling unit structures in the order presented in Part II-C. Indicate with a check mark ( ) in column (7) those households which are to be included in the 1957 sample. The method for determining which households are to be included in the sample is explained in Part II-B.

3. **Interview as you list:** Interviews will be obtained in each household listed. Questions 20-31 will be asked in each household. Additional questions will be asked in each 1957 sample household, questions 32-42. Whenever a person is located who was included in the 1948-49 study an interview using the complete set of questions 32-47 will be made, whether or not such a person resides in one of the 1957 sample households. The detailed interviewing instructions follow later in the manual.

4. **Checking your field work:** Before going out to a block in your area it will be advisable to check over the work that you did on the preceding day to make certain that you have not omitted any structures from your listing and that you have obtained all the required interviews. Such a check will also permit you to plan your work for the day to include second or third calls on those households not found at home on preceding visits.

5. **Special schedules for 1948-49 sample household addresses:** From the address listing of the sample of households included in the 1948-49 study we have prepared a set of special schedules to be used for these addresses. The special schedules differ from the regular schedules only in that the roster of persons who resided at that address in October 1948 has been given in the space provided under question 30. Since each such schedule must be used in the particular household to which it applies, you will of necessity have to

check the addresses which you intend to cover during a given day and have with you the particular special schedules which are required. The special schedules are filed by name of street and number in the Study Office. You may procure those pertaining to your work as you require them.

B. The 1957 Household Sample Selection Procedure:

The rule for determining which households will be included in the 1957 sample of households is very simple. Each of you will be given one of the numbers 1, 2, or 3. As you list the households in your area on your Listing Sheet, include the household having the number given to you and every third one thereafter; e.g., if the number given you is 2, households numbered 2, 5, 8, 11, ... in column (7) of your Listing Sheet would be 1957 sample households.

C. The dwelling unit and household definitions:

1. Introduction

The definitions given in this section are to be applied in deciding whether or not a group of persons is a household, whether their quarters are one dwelling unit or more than one, who are members of the household and what constitutes non-dwelling unit quarters.

Each household in the survey will be enumerated on a separate questionnaire. It is necessary, therefore, that you determine at the beginning of the interview whether or not there is more than one dwelling unit at the address. To do this you must have a complete understanding of what constitutes a dwelling unit.

2. The dwelling unit:

People live in all kinds of places - houses, apartments, tents, trailers. Some houses are arranged just for one family, some for two or more families, and others like apartment buildings, have living arrangements for dozens of families. Counting just houses and apartment buildings would not tell us much. We need some kind of unit to count which more nearly describes all of these living arrangements. "Dwelling Unit" is the name we give this unit.

a. General definition of a dwelling unit:

In general, a dwelling unit is a group of rooms or a single room, occupied or intended for occupancy as separate living quarters, by a family or other group of persons living together or by a person living alone.

Ordinarily a dwelling unit is a house, an apartment, or flat. It may also be a trailer, boat, tent, or railroad car, if occupied as living quarters. A dwelling unit may be located in a structure devoted primarily to business or other non-residential use, such as quarters in a warehouse where the watchman lives, or a barber's quarters back of his shop.

b. **Specific definition of a dwelling unit**: The specific definition of a dwelling unit depends whether there is only one, or two or more rooms in the living quarters and what facilities they have.

(1) **Group of two or mose rooms**: A group of two or more rooms is a dwelling unit if it is occupied or intended for occupancy as separate living quarters by a group of persons living together, or by a persons living alone, and has

1. separate cooking equipment, (as defined below)

or

2. a separate entrance, (as defined below).

(2) **Single room**: A single room is a dwelling unit if it is occupied or intended for occupancy as separate living quarters and

1. has separate cooking equipment

or

2. is the only living quarters in the structure (such as a one-room shack or a janitor's room in an office building)

or

3. is a one-room apartment in a regular apartment house.

c. **Separate Cooking equipment defined**: Consider a unit as having separate cooking equipment if it has:

1. a regular range or stove for the exclusive use of the occupants, whether or not it is used;

or

2. other cooking equipment (gas hot plate, electric plate, etc.) for the exclusive use of the occupants and either

a. the equipment is used for preparing meals, or

b. most of the living quarters in the structure have some kind of cooking equipment for preparing meals.

Cooking equipment is for the exclusive use of the occupants of living quarters when it is used only by the persons in these living quarters, and by no others.

d. **Separate Entrance defined:**

Consider a unit as having a separate entrance if the occupants can reach their quarters directly through an outside door or a common hall and they do not have to pass through anybody else's rooms and other occupants of the same structure do not have to pass through their rooms.

e. **Non-dwelling unit quarters:**

Living quarters which do not have separate cooking equipment or two or more rooms and separate entrance are combined with the landlord's quarters, or with each other if the landlord does not live in the structure.

If the combined quarters contain fewer than ten lodgers, they are considered one dwelling unit and would be enumerated as such.

If the combined quarters contain ten or more lodgers, they are considered one "non-dwelling unit quarters."

Other non-dwelling unit quarters include quarters in a transient hotel, tourist court, motel, or motor court. They also include living quarters whose occupants have common living arrangements, such as dormitory, bunkhouse, nurses' home, convent, monastery, institutional structure(s) containing living quarters for inmates or patients, and barracks for enlisted personnel in a military installation that are not specifically identified as such in item six on the questionnaire. If you find any non-dwelling unit quarters at addresses assigned to you for interviewing, refer to your supervisor for further instruction before completing the questionnaire.

f. How to distinguish between one dwelling unit and more than one occupied quarters: The decision as to what constitutes one dwelling unit is to be made on the basis of the living arrangements of the occupants, and not on relationship. For example, a family with married children in the same home or apartment sharing the same rooms and eating together occupies one dwelling unit. On the other hand, if a married son or daughter, lodger, or any person or group lives in another part of the house with separate cooking equipment, or if any live in separate quarters consisting of two or more rooms and separate entrance, such persons occupy separate dwelling units.

(1) Single Family or persons living alone: A whole house occupied, or intended for occupancy, by a single family or by a person living alone is one dwelling unit.

One room which is the only living quarters in the structure is a dwelling unit even though it does not have cooking equipment.

Similarly, in a regular apartment house, each apartment is one dwelling unit if it is occupied or intended for occupancy by a single family or by a person living alone. Usually such apartments have separate cooking equipment or consist of two or more rooms and a separate entrance. However, in a regular apartment house, you may find one-room apartments without cooking equipment; each of these apartments should be considered a separate dwelling unit.

(2) Two or more families; groups or persons: In some cases, you will find that several families or groups of persons live in the same house or structure. They may be distinctly separate families or groups of persons; they may be family groups related to each other (parents and married sons or daughters, for example) or they may be lodgers (roomers). Before you list such persons as one household ask as many questions as necessary to determine whether any of the families, groups, or lodgers occupy separate dwelling units. Ask first whether any of the families or lodgers have cooking equipment for their use. If you determine they do not have separate cooking equipment, then ask whether they have two or more rooms for their exclusive use. (Note that a bathroom is not counted as a room). Usually you can observe whether they have a separate entrance. Count as a separate dwelling unit each of the quarters of the families, groups, or lodgers, who have either separate cooking equipment or two or more rooms and separate entrance.

(3) Lodgers' quarters:

Count as a separate dwelling unit each of the lodgers' quarters which have either separate cooking equipment or two or more rooms and separate entrance.

Combine lodgers' quarters which do not have separate cooking equipment, or two or more rooms and separate entrance, with the quarters of the landlord. If the landlord does not live in the structure, combine all such quarters with each other; designate one of the persons as "Head" and each of the persons unrelated to him as "Lodger."

If there are fewer than 10 lodgers (roomers) in the combined group, consider the combination as one dwelling unit.

If there are 10 or more lodgers (roomers) in the combined group, consider this as one "non-dwelling unit quarters". Report all such cases immediately to your supervisor, without filling out the questionnaire.

In the count of lodgers, count only those lodgers whom you would list on the schedule as members of the household. Partners, hired hands, servants, foster childeen, wards, and the like, who are members of the household, are not to be counted as lodgers.

(4) How to obtain the necessary information:

Do not ask the respondent if he lives in a dwelling unit. Ask about the people who live there and their living arrangements. Question 20 b asks: "What are the names of all other persons who live here?" As the respondent answers this question, you should ask sufficient questions for you to determine if there is one or more than one dwelling unit at the address. The following examples illustrate the types of follow-up questions that you might ask when applicable:

"Is there more than one family living here?"

"Does your family occupy the whole house or only part of it?"

"Does your family have separate cooking equipment?"

"Does your husband spend only weekends here and the rest of the week in the city where you said he works, or does he divide his time in some other way?"

"Does your daughter live at the college in the town or does she sleep here and go back and forth to classes?"

Ask about all the people and all the living quarters in the house so that you can correctly classify a single household unit according to the definitions given above.

g. Vacant dwelling units:

To identify vacant dwelling units, follow a procedure similar to that for occupied dwelling units. A dwelling unit is vacant if no persons are living in it at the time of the interview. If the occupants are only temporarily absent, consider the unit as occupied.

h. Special dwelling places:

You may be assigned to interview at special dwelling places such as institutions, hotels, trailer camps, dormitories, or the like. Assignments in special dwelling places may consist of a single person, or designated persons to be interviewed; a designated room, trailer or tent, the occupants of which are to be interviewed; or similar special assignments.

If you are given an assignment to interview at a special dwelling place, you are to follow the instructions as to whom to interview and are not to attempt to apply the dwelling unit definition.

3. Definition of a household:

A household is the entire group of persons who live in one dwelling unit. It may be several persons living together or one person living alone. It includes the household head and all his relatives living in the dwelling unit and also any lodgers, servants, or other persons not related to the head, who live there.

4. Who is to be counted as a household member:

a. General rules

Two categories of persons in a household are to be considered as members of the household.

1. Persons, whether present or temporarily absent, whose usual place of residence at the time of the interview is this household.

2. Persons staying in the household wh have no usual place of residence elsewhere.

b. **Usual place of residence defined:** Usual place of residence means the place the person would name in reply to the question, "Where do you live?" More specifically, it is the place where the person usually sleeps. A usual place of residence must be specific living quarters held for the person to which he is free to return at any time. A mail address alone does not constitute a usual place of residence.

Persons with no usual place of residence else where will include recent migrants, persons trying to find permanent living quarters, and other persons who are staying temporarily in the dwelling and do not have a home of their own.

c. **Persons to be counted as household members:** Count as members of the household the following:

1. Members of the household living at home at the time of the interview.
2. Members of the household temporarily absent at the time of the interview, on vacation, visiting, or on business
3. Members of the household who are in a hospital but who are expected to return in a short period of time.
4. New-born babies who have not yet left the hospital.
5. Students of any age (including studen nurses) will be counted with the household in which they are living while attending school. When they are at home on vacation they will be counted at their homes.
6. Domestic or other employees who live with the household, sleeping in the same dwelling unit.
7. Boarders or lodgers who regularly sleep in the dwelling unit.

d. **Persons not to be counted as household members:** Do not count as members of the household the following persons:

1. Do not list as household members persons temporarily visiting with the household.

2. Do not count as members of the household persons of any age who are living elsewhere while attending school. If they are at home on vacation from such school outside the sample area, count them with the household.

3. Do not count as members of the household persons who take their meals with the household but usually lodge or sleep elsewhere.

   Do not count as household members domestic employees or other persons employed by the household but not sleeping in the same dwelling unit.

4. Do not count as household members persons who were formerly members of the household but have since become inmates of correctional or penal institutions, mental institutions, homes for the aged or needy, homes or hospitals for the chronically ill or handicapped, nurses' homes, convents or monasteries, or other places in which residents may remain for long periods of time.

5. Do not count as household members officers and crews of ships and persons living in lighthouses.

6. Do not count as household members persons working abroad for the United States Government if their regular place of duty is abroad.

However, you must count as a member of the household any person who usually lives there if he is temporarily abroad on a vacation or in connection with his work. A United States Government employee temporarily abroad in connection with his work should be counted as a member of the household at his usual place of residence unless his regular place of duty is abroad.

e. Summary of rules on how to consider special classes of persons:

Persons who work away from home: Some persons sleep most of the week in one locality to be near their place of work and spend weekends or other nonwork periods in another locality Count such persons as members of the household in which they live while away from home.

Domestic employees: Count as household members any maids, laborers, or other employees who live with the household and sleep in the same dwelling unit. However, do not count domestic employees who sleep in separate houses or cabins as members of the households, even though the house is on land owned by the household in which they are employed.

Boarders and Lodgers: Count boarders or lodge as household members of the place where they are rooming or lodging, if that is their usual place of residence. The place where they are boarding or lodging is their usual place of residence if they stay there at least four nights a week, even if they spend weekends some place else.

Patients in general hospitals: Most patients in general hospitals are there temporarily and have some other usual place of residence. Count patients as members of the hospital household only if they have no other place of residence. A list of persons having no permanent homes can usually be obtained from the institution records.

Persons engaged in transportation services or traveling: Railroadmen, bus drivers, expressmen, railway mail clerks, traveling salesmen, etc., usually have homes to which they return at intervals and which constitute their usual place of residence.

Soldiers, sailors, marines, and airmen: If soldiers, sailors, marines, and airmen in the service of the United States usually sleep off post in the area where they are stationed count them as household members of the place where they usually sleep. If, however, any household reports that one of its members is a soldier, sailor, marine, or airman stationed elsewhere, do not count him in that household.

5. Special household rules: You are to interview the household living in the dwelling unit on the day of your contact regardless of when they moved into the unit.

For example: Suppose you make your first call to interview a household on Tuesday, and find no one at home. For some reason you are unavoidably prevented from calling back until Saturday, when you find that the family you would have interviewed on Tuesday has moved and another family moved in on Thursday. You will interview the household occupying the unit at the time of your contact (i.e., Saturday).

D. The Identification Items on the Schedule:

The items on the identification page of the questionnaire are required to identify the unit to which each schedule applies, to record pertinent information concerning the interview, and to simplify reassignment of an interview to another interviewer in those cases requiring special attention. There are no questions to be asked of household respondents on this page.

Item 1. From column (7) of your Listing Sheet record the number you have assigned to the household to which this schedule applies.

Item 2. Record the address including: avenue, street, alley, way, plan or other designation, the house number, apartment number; any descriptive phrase you feel might help another interviewer locate the household, e.g. apt. above garage in rear of house at 219 Allen Avenue.

Item 3. Record the number at the top of the Listing Sheet on which this household is listed and the line number (column 1) corresponding to this household.

Item 4. From column (4) of the Listing Sheet enter the number of occupied dwelling units in the structure at this address.

Item 5. Enter your own name. In some cases you will be able to complete Items 1-5 before you interview the household. In other cases it may be more convenient to complete them after the interview. In any case, however, remember you must check the household address before beginning the interview to determine whether a special schedule including the 1948 household roster of persons residing at this address (Question 30) will be required. In some cases where structures have been demolished or renovated since 1948 you may encounter difficulty in deciding whether a special schedule is required. Refer such cases to your supervisor after you have obtained all pertinent facts regarding the changes in the structure since 1948.

Item 6. Since questions 20 through 31 will be asked in every household and may be answered by a single respondent, record the column number corresponding to the respondent for these questions and his relation to the head of the household (Question 21) in the appropriate spaces. Questions 32-42 must be asked in each household having a check mark in column (7) of your listing sheet. Any 1948 sample persons located will be asked questions 3 through 47. Thus, in some cases one person will respond for all members of the household. In other cases, there may be several respondents each responding for himself or himself plus other members. Enter the column number of the persons questioned in the first column and the column number (or numbers) of persons for whom answers were given by this respondent in the second column. For example suppose a household consisted of the father, mother, and two children listed in columns 1, 2, 3 and 4 on the inside of the schedule, respectively. If you had questioned the mother about herself and the two children and the father about himself for items 32-42 the entries would be as follows:

6. Identification of Respondent

Items 20-31

Respondent	Relation to Head
2	Wife

Items 32-42 or 47

Respondent	Respondent for
2	2, 3, 4
1	1

If more space is required use the back of the schedule.

Item 7. In the first column under this item we have indicated what the purpose of a call to this household might be. If the purpose is to interview the household, row one is appropriate. If a second call to the household is necessary to interview a 1948 sample person who resides there, the second row is to be used to record the date of such calls. The "other" category would be used for special reasons for additional calls on a household as may develop during your work. Enter the date of each call (each attempt you make to interview either the household or 1948 sample person) under the column corresponding to the number of that call.

Item 8. Describe in full the reasons which prevented you from completing the work in this household in those cases where you have been successful in finding at home a person eligible to answer the questions 20-32.

Item 9. If an unproductive call on a household has been made, you will try to determine from neighbors or other sources when you would be most likely to find an eligible respondent at home. You will wish to do this to avoid making unecessary calls which will delay your work. Enter, in the space provided, the time when you should call and any other related information.

Item 10. Try to obtain the telephone number of those households not interviewed as well as those in which you interview. A telephone call may result in giving you the necessary information as to the best time for you to make a second or third call on the household. The telephone may also be used to clear up questions which may arise when your interview are edited, thus avoiding an extra call on the household. When an interview has been completed, routinely ask the telephone number and record it in the space provided.

Item 11. If some of the interviewing in a particular household has been completed, but for some reason another call will be required, enter here the name of that person whom you consider should be used in re-establishing contact in the household. For example, if you completed the interviewing in a household except for questions 32-47 for the husband who was not at home, on a second call on the husband you might feel that an introduction could best be accomplished through his wife with whom you became acquainted on your firs visit. If a telephone call to the household is required, the name of the person to ask f would be entred in the space provided.

Items 12-14. These items will be filled in by a supervisor in those cases requiring their use.

Item 15. Check the appropriate boxes under the column headed "required". The entries in this column will indicate (1) the kind of a household involved and consequently the questions which must be answered. Enter the column numbers for all 1948 sample persons located.

Enter the column numbers for individuals for which medical authorization forms are required. When the work is completed enter the date completed in the next column. In the space for remarks, record any pertinent information relating to the state of completion of the work.

Item 16.

In some households there will be more than five household members. This situation will necessitate the use of two or more schedules for these households since only five columns are provided for individuals. Enter here the number of this schedule in the household and the total number used. For example, if 11 persons were members of a single household, three schedules would be required. Following the prescribed order you would list the first five members in column 1 through 5 on the 1st schedule, the next five on columns 1 through 5 of the 2nd schedule, and the last one on column 1 of the 3rd schedule. The column numbers on schedule two would be crossed out and re-numbered 6 through 10. The 1st column on schedule 3 would be re-numbered 11. On the face of the 1st schedule you would record items 1-16. Item 16 would read: schedule 1 of 3 schedules. On the face of schedule 2 you would complete only items 1-5 and 16. Item 16 would read: schedule 2 of 3 schedules. Similarly only items 1-5 and 16 would be filled in on schedule 3 and item 16 would read: schedule 3 of 3 schedules.

Items 17-19.

You will leave these blank as they are to be used by the supervisors in checking your work.

PART III. THE SCHEDULE

A. Sections

The schedule to be used in the survey is divided into four sections:

1. The Identification Section consists of the front page of the schedule. It is for use by you and the Boro office in keeping a record of the interview. It does not contain any questions to be asked of the respondents.

2. The Personal Characteristics Section consists of questions 20 - 39, with the exception of questions 30 and 31. It provides for a listing of persons to be reported on the schedule and their personal characteristics. Questions 30 and 31 provide for the identification of the 1948 sample persons and are arranged in tabular form.

3. The Health Section consists of questions 40 - 47 and Tables I and II. It provides for information about the health of each person listed on the schedule.

4. The Comments Section, the back of the schedule is to be used in noting additional information or comments.

B. Arrangement

The inside of the schedule is laid out in a columnar arrangement. A separate column is filled in for each person. The questions to be asked appear on the left-hand side of the page, and check boxes or space for recording the replies for each person appear in the individual columns.

C. Questions in heavy type

The questions to be asked the respondent appear in heavy black type. Instructions for you regarding the conditions under which the questions are to be asked, and how to enter the replies, appear in light type.

D. Use of pronoun "you"

In most cases the questions include the word "you", which actually applies only when you are talking to the respondent about her own characteristics and health conditions. When you are inquiring about other members of the family, you would substitute for the "you" either "he" or "she" or the name of the person involved.

E. Other features

Other features of the schedule will be pointed out in the discussion of the questions to which they apply.

F. Personal Characteristics

As pointed out above, items 20 - 28 and 32 - 42 will be obtained for a sample of Donora households. Items 20 - 31 will be obtained from the Census households only and items 20 - 47 will be obtained for the 1948 sample persons.

Detailed rules for determining what a household is, and who are its members, are given in Part II of this manual. Generally, by "household" is meant a group of people who occupy a dwelling unit or separate living quarters, such as a house, or an apartment or flat. It includes the head of the household and his family, and also any lodgers or other persons living with them.

The purpose of questions 20 - 39 is to list the members of the household, and obtain information as to their relationship and other personal characteristics, as a background for the questions about their health.

Question 20
Household listing

1. Order of asking the parts of question 20

Question 20 a "What is the name of the head of the household?" is the opening question of the interview, and should always be asked first. Then ask question 20b to obtain the names of the other household members. Questions 20c and 20d are always asked after the respondent has given you the names of the other members of the household. They are reminders about persons who may be overlooked by respondents. For example, there is sometimes a tendency to report only family members and leave out household members not related to the head; or to forget to mention persons who may be away from home at the time of the interview. Add to the schedule the names of any household members you obtain in answer to questions 20c and 20d.

2. Who are household members

The rules given in Part II for determining which persons are to be considered members of a household must be applied in every household. You should ask whatever additional questions that are necessary in order to properly determine the membership of the household.

3. Related and unrelated members

All members of the household, regardless of whether they are related to the head, will be listed on one schedule (or sets of schedules if more than 5 persons.)

By "related" is meant related by blood, marriage, or adoption.

4. Prescribed order of listing household members

List the members of the household in the following order:

1. Head of the household
2. Wife of the head
3. Unmarried children of the head, or of the wife, in order of their ages, beginning with the oldest
4. Married sons and daughters (in order of age) and their families listed in order: husband, wife, children
5. Other persons related to the head
6. Lodgers and other persons not related to the head

List all persons not related to the head, for example, lodgers, roomers, etc., in a convenient order. If among persons not related to the head there are married couples or persons otherwise related to themselves, they should be listed in the order indicated for the families of married children (group 4).

5. How to enter names

Begin with column 1 for the head of the household and use a separate column for each person. Do not skip columns.

In the column for the head of the household, enter the last name in the space provided at the top, and enter the first name and initial in the space below the last name. Do not assume members of the household have the same name. However, for each household member with the same last name as the person in the preceding column, enter a long dash instead of repeating the last name.

For example:

Col.1	Col.2	Col.3	Col.4	Col.5
Doe	——	Jones	——	Roe
John T.	Betty G.	Olive A.	Samuel D	Thomas B
Head	Wife	Daughter	Grandson	Lodger

Question 21 Relationship to head of household	
1. Head of household	There can only be one head of the household. Enter "Head" in the column for the person who is named by the respondent as the head of the household.
a. Head defined	Head of household is defined as the person who is regarded as the head by members of the household. In most cases the head is the chief breadwinner of the family, although this is not always true. In some cases the head may be the parent of the chief earner, or may be the only adult member of the household. In the case of a man in the armed forces, list him as the head only if he continues to live at home and is, therefore, a household member.
b. Not related to head	If there are any persons in the household who are not related to the head, but are related to each other, their relationship to each other should be shown also. For example, a lodger and his wife should be listed as "lodger" and "lodger's wife" (not simply wife); a lodger and his brother should be listed as "lodger" and "lodger's brother"; a servant and her daughter should be shown as "servant" and "servant's daughter".
Question 22 Race	Do not ask this question, but check the proper box for "white", "negro", or "other", from observation. Assume that the race of related persons living in the household is the same as the race of the respondent, unless you learn otherwise. Exception: In the case of servants and hired hands (who are household members), inquire specifically as to their race.
Question 23 Sex	Check the proper box to show the sex for each person in the household. Usually the name and relationship will indicate the correct entry for sex for each person. In some cases, however, the name may be common to both sexes; e.g. Jean, Francis (Frances). If you have any doubts ask a question.
Question 24 Age	Be sure to obtain the age of each person at his last birthday. For babies under one year of age, enter the month of birth instead of age, as, for example, April, May, etc.

Question 25
Marital Status

Question 25 is to be asked only for persons 14 years of age and over. Ask the question as it appears on the schedule, reading all of the words, "married", "widowed", "divorced", "separated", or "never married". In many cases marital status can be determined from relationship. For children under 14, check the box "never married", without asking the question.

Question 26
Name in October 1948

Be sure to obtain the name of each person in October 1948 if it was different then than it is now. If the name was the same, check the proper box, and if the person was not born, check not born.

Question 27
Address in
October 1948

Write the address for each person if it was different in October 1948 than it is now. If the address was the same check the proper box, if the person was not born, check not born.

Question 28
Head of Household
in October

Write the name of the head of the household in which each person on the schedule lived in October 1948, if it was different then than it is now. If the name of the household head was the same in October 1948, check same. If person was not born in October 1948, check not born.

Question 29
1948 Sample
Person

This question is not to be asked. If the address of the household being interviewed was a 1948 sample address, a list of names of persons living in that household will appear in Question 30. For the names which are identical in questions 20 and 30, enter "yes" in the appropriate columns. For any names which do not appear in question 20, first check "Not Born" for those who are too young to have been born in October 1948 and then look up any remaining names do not appear in the alphabetical list. If the names do not appear in the alphabetical list, check "no" in the appropriate columns. If this is not a 1948 sample address, no names will appear in Question 30. In cases of this kind check all the names, except those who were not born in October 1948, against both the alphabetical and the address list.

Question 30
1948 Sample
Roster

If this is a 1948 sample address a list of names in the 1948 household will appear in this question. For each of the names listed in question 30 which do not appear in question 20, ask parts a through c of question 30 and enter the answers in the space provided. If the respondent knows the address of the person, enter it on the form and if the person has married and changed her name, enter her new name also. If the respondent does not know where the person is living ask part b of the question and enter the name and address of anyone who might know where the person is living. If the respondent has no information on the person enter "no information". If the respondent reports that the person has died, ask for the place, date and cause of death. Also ask if the person was hospitalized before he died and name of hospital and date of hospitalization. If this address was not a 1948 sample address, no names will appear in Question 30. In cases of this kind, skip question 30 and proceed to question 31. For persons whose names appear in both questions 20 and 30, enter "located" in the space provided.

Question 31 1948 Sample Roster

If the address at which the interview is being taken is not a 1948 sample address, it may be possible that there are persons appearing in Question 20 who have a "Yes" listed in answer to question 29. Using your alphabetical listing look up the address of the household in which each such person resided in 1948. Turn to the address listing for this 1948 address and record the names of all persons who resided in the same household with him. For each name thus recorded in question 31 which does not appear in question 20, ask the same questions as appear in Question 30. The instructions given in ques-30 should be followed in question 31 and any information obtained should be entered in the space provided. If additional space is needed to enter names of the 1948 households, use the back of the schedule.

The success of the procedure which has been adopted for this study will depend in a large MEASURE on the answers obtained in questions 30 and 31. Use additional questions when necessary to obtain this information.

G. Completion of Census Information

At the completion of Question 31, if there are no "yes" entries in question 29 and this is not a 1957 sample household, stop the interview here and proceed to the next household. For households containing a 1948 sample person and 1957 sample households, check the box "responded for self" in the appropriate column under the name of the respondent. For all other persons appearing on the schedule, enter the column number of the respondent, for example, enter column 2 if that is the number of the housewife and she was the respondent. It is not necessary to do this in the case of Census households, when the interview is finished with the completion of question 31.

Question 32
Place of Birth

For each person appearing in question 20, enter town or city of birth if born in Pennsylvania; enter city and state if born outside of Pennsylvania and enter country if born outside of the United States. Enter date of birth for all persons. For part b, enter the number years lived in Donora, if person has lived in Donora all his life, enter always. If not a lifetime Donora resident, record present residence and give places where person has lived for a year or more. Work back through time.

Question 33
Education

This question is to be asked only for persons 14 years of age, or older. Circle the number or check the space between two numbers to indicate the answer: "9th grade" would be recorded

8 10 12 14 16

which "finished high school" would be

8 10 12 14 16.

Question 34
Occupation

This question relates to the kind of work performed by each working member of the household. If the person is a mechanic, state what kind of a mechanic, such as automobile. Try to use precise terms giving the full title of the job, and if necessary to make it clearer, include a brief description of the duties involved. For persons not employed outside the home enter RETIRED, DISABLED, UNEMPLOYED, HOUSEWIFE, etc., as the case requires.

Question 35
Place of work

For each person recorded in question 20 who is 18 or over, enter the name of the company by which he is employed. For example, if the person is employed by the American Steel and Wire Plant, give the name of the Company and the Plant, either Zinc, Steel or Wire, and the department in the plant. If person is not employed so state.

Question 36
Previous work history

For each member of the household who is employed or who has been employed, record last previous occupation or employer. For example, Job: automobile mechanic; Place, Detroit; When, 1952-56. Start with the last occupation before the present occupation and work back through time for any job held for one year or more.

Ask questions 34 through 36 down for each individual completing the three questions for each person and then starting with the next person.

Question 37
Smoking history

Check the appropriate box either "Yes" or "No".

Question 38
Smoking history

Enter number of years person has smoked if he has a "Yes" answer to question 37.

Question 39
Smoking history

Check none if the person smokes only cigars or pipes, or does not smoke at all. If the person smokes cigarettes enter the average number per day, such as 20, etc.

Ask questions 37-39 down for each individual completing the three questions for one person and then starting with the next person.

H. Health Questions

The rest of the schedule is made up of health questions and one general rule to be followed is that interviewers are to record as illness whatever the respondent reports. The answers should be entered as nearly as possible in the language used by the informant.

The card in the cellophane jacket is to be handed to the respondent for use in the next three questions. Hand the card to the respondent with the Disablement and Chronic Disease lists face ready for her to read.

Question 40
Disablement

Use the introduction written at the beginning of the Disablement List as you hand the respondent the card. If she answers "no", check the "None" box all the way across the schedule. If she says "Yes", circle the letter which relates to the description of the disablement and ask for the date of onset and the reason. For example, if the respondent reports that someone in the household uses a wheel chair, circle "b" in the appropriate column under the persons name, enter the date of onset and give the reason which might be arthritis or some other crippling ailment.

Question 41
Chronic Conditions

Ask the informant to look at the list of chronic conditions and report whether anyone in the household has any of these conditions. If she says "no", check "none" all the way across the schedule. If she says "Yes", ask which ones and circle the proper letter in the appropriate column.

Question 42
Symptoms

Ask the respondent to look at the list of symptoms on the other side of the card in the same way. If she indicates that none in the household has any of these symptoms check "None" all across the schedule, but if she reports that persons in the household do have some of these symptoms, enter the letter referring to the symptom in the appropriate column underneath the name of the person concerned.

I. Completion of 1957 Sample Household

If this is a 1957 sample household containing no 1948 sample persons, with the completion of question 42, the interview is finished. Questions 43 through 47 are to be asked only of 1948 sample persons, that is for persons with "Yes" as an answer to Question 29.

Questions 43-45 are to be asked for each person separately down the schedule. The answers to questions 43 through 45 are to be entered in Table 1, giving the column number of the person referred to in column a of Table 1, and the number of the question being answered in column b of Table 1. The questions in columns c through k are to be asked for each "yes" answer obtained in questions 43-45. There is only one exception to this rule, that is if any chronic conditions have been listed in response to question 41 for any person, check the box cc in column f of Table 1 and skip to k.

Question 43
Under Doctor's care

Ask this question of the respondent about herself first. If the answer is "Yes", check the "Yes" box and enter her column number in column a of Table 1, and the question number, 43, in column b. Then ask the question in column c of Table 1; "What did the doctor say it was - did he use any medical terms". Enter her answer to this part of the question in her exact words as nearly as possible. Then ask the questions in columns d and e giving the month and year of the last time the doctor was seen and the doctor's name and complete address if outside Donora. If this is a chronic ailment which also appears in the answer to question 41 for this person, check cc under column f, and skip to column k. If it is not a chronic ailment but the person has repeated trouble, check "Yes", if the person does not have repeated trouble check "No". Then ask the question in column g giving the month and year of the answer. In column h ask for the approximate number of days in the past year that this illness or condition kept the individual from his usual activities. If the answer is "none", enter "None". In Column i check either the box for "frequently", "occasionally", or "rarely" depending on the respondent's answer as to how often he sees a doctor for this condition. In column j, check "regularly", "occasionally" or "no at all" depending on the respondent's answer as to whether he takes medicines or treatments for this condition. In column k enter the details as given by the respondent as to whether this condition has caused him to lose time from work or to submit a medical insurance or benefit claim. (This would include Blue Cross, Blue Shield, Commercial, Lodge or Union Sickness insurance, etc.) If the answer to this question is "no" for the respondent, check "no" and proceed to question 44.

Question 44
Conditions or Symptoms

If the respondent has answered "yes" to a condition or symptom mentioned in questions 41 or 42, ask this question and enter the information in Table 1 following the instructions given for question 43. If the respondent has not seen a doctor for any conditions or symptoms mentioned in 41 or 42, check "no" and continue to question 45.

Question 45
Illness since October 1948

Ask the respondent about illness from other causes since 1948 and if the answer is "Yes", check "Yes" entering the information in Table 1 and following the instructions given for question 43. If the answer is "No" check "No" and continue to question 46.

Question 46
Hospitalization since October 1948

This question relates to hospitalizations since October 1948. If the respondent answers "Yes" enter her column number in column a of Table 2, and the question number - 46 - in column b. Then enter the month and year in column c for date she entered the hospital the first time since 1948. In column d enter the condition for which she went to the hospital and in column e give the name and address of the hospital including the city and state if out of Pennsylvania. If the respondent has been in the hospital more than once since October 1948, follow through with all hospitalizations in the space provided. If additional space is needed record the information on the back of the schedule. If the answer to this question is "No" check "No".

Having completed these questions 43-46 for the respondent, ask them for the other members of the household following the instructions given above. If additional space is needed, record the information for Tables 1 and 2 on the back of the schedule.

Question 47
Smog Episode in 1948

Ask this final question for all the persons listed on the schedule. If the answer is "Yes", check "Yes" and if the answer is "No", check "no".

IV. THE INTERVIEW

A. Whom to Interview

1. Respondent must be a responsible member of the household.

You must interview a responsible member of the household to obtain the information for the questionnaire. By a responsible member is meant an adult (18 years of age or over), who knows about the health of other members of the household. Any respondent can give information for all members of the household related to him. Related members of the household are all members related by blood, marriage, or adoption.

Do not attempt to bbtain information for the household from children, neighbors, or domestic employees.

2. Respondent for children.

Information for children must always be obtained from an adult, preferably the person responsible for their care. Generally, this will be the housewife. For this survey consider as children those under 18 years of age.

3. More than one adult household member present.

   a. Ask each adult member to answer for himself.

If more than one adult member of the household is at home at the time of your call, ask each one to answer the health questions for himself. For example, if on your first call to the household both the head of the household and his wife were at home, you would direct the health questions to the wife about herself, and the head of the household would andwer for himself.

   b. Select most qualified of adults at home as respondent.

If more than one eligible respondent is at home, obtain the information for those not present, and for the children, from the one best qualified to answer. Usually the housewife is the person most likely to know about the health conditions of the various members of the household, as well as the other items of information that are required.

4. Unrelated household members.

Information for a member of the household who is not related to the head of the household by blood, marriage, or adoption is to be obtained from the unrelated person himself Such persons, even though living in the household will not usually share with the househol the kind of information required in this study. Examples of such persons are roomers or lodgers, and domestic employees. Members of the household who are related to each other, even though not related to the head, may report for each other if they meet the other requirements for an eligible respondent; for example, a lodger and his wife.

B. How to begin the interview

1. Introduce yourself to the respondent.

The first step in the interview is to introduce yourself to the respondent by giving your name and stating that you are on the staff of the Donora Health Survey which is being conducted by the Graduate School of Public Health of the University of Pittsburgh.

Use an introduction something like this:

"I am _________ from the staff of the Donora Health Survey which is being conducted by the Graduate School of Public Health of the University of Pittsburgh. Here is my letter of identification (Show your letter). We are making a health survey in Donora and I have some questions to ask about you and your family."

If you find it helpful, you might add:

"You may recall reading about the health survey in the paper recently or hearing about it on the radio."

2. Ask the first question as soon as possible.

After introducing yourself, continue immediately with the first question:

"What is the name of the head of this household?"

The sooner you get the respondent to participate in the interview, the better. To start off with the interview is much more desirable than trying to describe the types of questions you are planning to ask.

If you are not invited in after you have asked the first question, you may suggest that you can record more quickly and accurately the information if you may come inside where you can sit down.

3. If persons outside immediate family are present.

If persons who are not members of the immediate family are present, suggest to the respondent before continuing that he might prefer to talk to you in a more private place. While a respondent might not refuse an interview because of "outsiders" being present, this fact might, nevertheless, result in loss of information because of reluctance to talk about certain types of illnesses in the presence of others.

4. If respondent questions purpose.

If a respondent questions the purpose of the survey, explain that it is being taken to obtain information on the health of the people of Donora. Point out that all information about individuals will be given confidential treatment. If it is necessary to give additional explanation, you should base it on the material given in Part I - Description of the Study, using your own words to suit the level of understanding of the respondent.

If you are asked why you are interviewing this particular household, explain that we are interviewing in every household in Donora to locate persons who were interviewed by the Public Health Service in 1948 and 1949 to determine changes in their health which bacurred in the past eight years. In addition, interviews are being made in one-third of the households in Donora to describe the present health status of the Boro's residents.

C. Your own manner.

Combine a friendly attitude with a business-like manner. It is important that the respondent realize that the questions deserve serious attention. This impression can be given only through youw own manner. Avoid "talking down" to respondents when explaining terms but give as direct and simple an explanation as possible.

It is especially important in this survey that you maintain an objective attitude. Do not indicate a pessonal opinion about replies you receive to questions, even by your facial expression or tone of voice. Since the illnesses discussed may be of a personal or serious nature, expressions of surprise, astonsihment, disapproval, or the like, on your part can cause respondents to give untrue answers or to withhold information. Your own objectivity about the questions will be the best method for putting the respondent at ease and making her feel free to tell you of the ailments, illnesses and symptoms experienced by herself and her family.

To keep the interview on a conversational level, you must know the questions well enough so that you will not sound as if you are reading them to the respondent even though you are using the exact words printed on the questionnaire.

D. How to ask the questions

1. Follow the order on the questionnaire.

Ask the questions in the order specified in these instructions. If you change the order it is likely that both you and the respondent will become confused. This is especiall true of the health questions. For example, the questions on health relate to different periods of time. Questions 40, 41 and 42 relate to chronic conditions and symptoms present at the time of the survey while 44 and 45 relate to events occurring in the past 8 years. Asking the questions out of order would force the respondent to keep jumping back and forth between time periods and would invite confusion.

The questions in Table 1 are to be asked only after all conditions for each related member of the household have been reported in questions 40-46. Going back and forth between the top and bottom of the questionnaire would be the "hard way" to conduct the interview. It is also likely that if you should skip around the questionnaire you would not remember to ask every question for every person.

2. Information given out of turn or volunteered.

Sometimes respondents will start describing the illnesses in the family in answer to the very first question and will cover their own conditions and those of other family members in such a way that it is difficult to keep straight which person has which condition. When this happens, you should explain your problem to the respondent, namely that you can't keep up with her in recording the information and at the same time be sure that you are recording accurately what she says. Then, ask her to permit you to ask the questions as they appear so that she won't have to give the information more than once.

3. Ask each question exactly as worded.

You must ask each question exactly as it appears on the questionnaire.

The wording and order of each question has been tested in actual interviewing, and has been carefully designed to give the desired information. Therefore, the uniformity and value of the final results depend on all interviewers asking the questions in the same order and with the same wording.

4. Avoid influencing the respondent.

Experience in other studies has shown that respondents tend to agree with what they think you expect them to say even though the facts in the case may be different. Therefore, you must avoid "leading" the respondent by adding words to the questions or making slight changes in them or indicating the answer you expect to hear. Even slight changes which may seem to make no apparent difference can prove harmful and should be avoided. For example, if no chronic conditions or symptoms are mentioned in questions 40-42 and if the person is not under a doctor's care, now you might be tempted to change question 43 to "Then, you have not been ill from any other causes since October 1948 which required you to see a doctor?" This change invites the respondent to say "Yes, that is true." In that way the entire purpose of question 43 is defeated.

In obtaining the information on the health conditions of the members of the household you need to be especially careful in not influencing the respondent. For example, it would be extremely damaging to change the question:

> "Do you take medicine for treatments for ________ regularly, or just once in awhile or not at all?"

to:

> "You don't take any medicine or treatments for ______ do you?"

or to reword the question:

> "What did the doctor say it was-- did he use any medical term?"

to:

> "Did the doctor say you had bronchitis?"

These changes suggest answers to the respondent and that is why they must be avoided. In an effort to be helpful the respondent may say "Yes, that was it" or "That is true" or "That sounds about right", whereas the true facts may have been quite different. Sometimes the respondent may not know the answers to the questions, and if this is the situation the fact that she doesn't know should be recorded. In all cases the respondent's answers should be free from influence on your part.

E. Listen to the respondent.

Listen to the respondent until she finishes her statement. Failure to do so can result in your putting down incorrect or incomplete entries. The two most common types of error made in this regard are:

1. Failure to listen to the last half of the sentence because you are busy recording the first half.
2. Interrupting the respondent before she has finished, especially if the respondent hesitates. A respondent often hesitates when trying to recollect some fact, and you should allow sufficient time for this to be done. Also, people will sometimes answer "I don't know" at first, when actually they are merely considering a question. When you think that this may be the situation, wait for the respondent to finish the statement before repeating the question or asking an additional question.

F. Repeat the question when necessary.

The respondent may not always understand the question when it is first asked, and sometimes you can tell from the respondent's answer that the question has not been understood. In this case, repeat the question using the same phrasing as you used originally. This should not prove to be offensiv since what you said the first time was not heard or understood. Frequently, the respondent is capable of understanding the question but has missed a word or two. If you think it helpful, you can preface the repetition of the question by a phrase such as "I see" or "Oh yes," or the like, and then repeat the actual question. A conversational tone will go far in making it sound like a new question even though you are using exactly the same words.

G. Do not practice medicine.

You are to interview the respondent, not practice medicine. Do not try to decide yourself whether or not any member of the household is ill: enter on the questionnaire everything the respondent mentions. If a respondent mentions some condition, but can't make up his mind whether he was "ill", enter the condition on the questionnaire and ask the appropriate questions about it.

Do not attempt to diagnose a respondent's illness from his symptoms, or to substitute names of diseases for the respondents own description of the trouble. If a respondent' answer to a question is not specific or detailed enough, ask additional questions. However, your final entry must always represent what the respondent said, in his or her own words.

H. When to ask additional questions.

Sometimes a person will give you an answer which does not furnish the kind of information you need or one which is not complete. You should always ask additional questions in such cases, being careful to encourage the respondent to do the explaining without your suggesting what the explanations might be. In all sections of the questionnaire you should ask as many questions as necessary to satisfy yourself that you have obtained complete and accurate information insofar as the respondent is able to give it to you. Knowing when to ask additional questions is especially important with regard to the health questions since we wish to get as complete a report as possible concerning illnesses.

I. How to ask additional questions.

The first step in asking additional questions is to know when they are needed. The second step is to know how to ask additional questions in such a way that you obtain the information you need, and at the same time refrain from influencing the respondent's answers. There are many acceptable phrases that can be used as general inquiries to draw out the respondent, such as "Please explain that a little more," or "How did this affect you?", or "Why do you feel that this is true?", or "Why do you think that is the case?", and so on. In all instances you will need to fit the questions to the information you have already been given. The examples given below point out some acceptable methods of doing this as well as some methods that are not acceptable.

	Acceptable	Not Acceptable
1.	Would you explain further the living arrangements here?	I don't know how to count you people - do you consider yourselves all one household?
2.	You told me your husband has seen a Miss Thomas for his rheumatism. Is Miss Thomas a medical doctor?	You told me your husband has seen a Miss Thomas for his rheumatism. Miss Thomas is a medical doctor, isn't she?
3.	You said your son William was in the hospital sometime in 1954 but you don't know just when. Was this early in the year, the summer, or the latter part of the year? Was it before school started in the fall or after?	You said your son William was in the hospital sometime in 1954 but you don't know just when. Was it before Thanksgiving?
4.	You said you had pains in your arms and you saw a doctor - what did he say the pains came from?- Did he give it a name?	You said you had pains in your arms and you saw a doctor - did he say it was bursitis or arthritis

The above examples illustrate some correct and incorrect methods of asking additional questions. The "not acceptable" questions as illustrated by example (1) illustrates an interviewer's inability to apply the Census rules for determining a household, expecting the respondent (who doesn't know the Cenus rules) to make the decision. It also illustrates an invitation to the respondent to just say "Yes" without giving the question any thought.

The "unacceptable" portion of example (2) is a clear-cut case of leading the respondent into an answer that may or may not be true. It is an open invitation to report that the respondent's husband saw a medical doctor for his rheumatism in order to agree with the reply obviously anticipated by the interviewer.

Example (3) illustrates the correct way to give the respondent to tie an event to a particular period of time when it is not possible otherwise to recall the exact date. There would be subsequent questions to go through once it was decided whether the event was before or after school opened. Each question following should be phrased objectively, of course, and no one date alone should ever be suggested to the respondent.

Example (4) (not acceptable) illustrates the way a question can limit the respondent's answer. If, for example, the doctor had said angina pectoris had caused the pains in the arms, the respondent might not feel free to say so since the interviewer's question might be interpreted as an interest only in bursitis and arthritis. Remember that you need to get the "why" behind the answer if the respondent knows it; if the respondent does not know the "why", the fact that it is not known is to be recorded.

J. Use observation as well as questioning.

Use observation as well as questioning in order to obtain complete information. For example, if you see a person in the house who appears to be at home there but had not been reported as a member of the household, find out whether he is a member and record it in the appropriate column just the same as you would have recorded his name had the respondent included him in her answers to question twenty.

K. Examples of acceptable questions and acceptable entries.

(Table I-Col. d)

Listed below are some hypothetical answers, acceptable additional questions by the interviewer and acceptable entries for the questionnaire--in no case would the original entry have been sufficient.

Original entry	Acceptable questions	Acceptable entry
Lost left leg	What was the reason the leg had to be amputated?	Amputation of left leg--diabetic--gangrene
Lost right arm	Why was the arm amputated?	Amputation of right arm--infection caused by arm crushed in auto accident
Cough	What caused the cough?	Cough due to cold

Original entry	Acceptable questions	Acceptable entry
Fever	What caused the fever?	Fever--cause unknown
Backache	What caused your backache?	Bachache--due to arthrit
Cyst	Where? What Kind of cyst did the doctor say it was?	Benign cyst--on ovary
Removal of right breast	What was the reason for the surgery?	Removal of right breast-malignant tumor of breas
Pain in side	What caused the pain?	Pain in side due to enlargement of prostate gland
Scalded arm	How did it happen?	Scalded arm--pot fell off kitchen stove at home.
Skin rash	What caused the rash?	Penicillin reaction
	Why were you given penicillin?	Taken for virus infection
Fever and sore arm	What was the cause?	Reaction to vaccination
	What kind of vaccination was it?	For smallpox

L. Recording information correctly.

1. General

Recording the information exactly is just as important a part of the interview as asking the questions correctly. This involves writing clearly and plainly, recognizing in advance the amount of space allotted for descriptive entries and adjusting the size of your writing to fit into the space provided. If additional description is required, make free use of the footnote and comments space at the end of the questionnaire. Be careful not to leave blank spaces where they should be filled in. You may use ink or pencil as you prefer. In case you use pencil, be sure the lead isn't so soft that it smudges, or so hard that it is difficult to read.

2. Recording answers of "don't know"

Every effort should be made to encourage the respondent to give specific and complete answers to the questions. However, it may happen in rare instances that the respondent doesn't have the information needed to answer a question. In such cases, you should enter "Unknown" in the space for the answer and explain the circumstances in a footnote.

3. Recording information for unrelated persons

As pointed out earlier, the same questionnaire (or set of questionnaires, if there are more than five persons) is to be used for an entire household, including the members not related to the head. Since you must interview the unrelated members separately from the related members, you must be careful about two points:

1. You must not permit any respondent to look at information previously entered on the questionnaire for persons to whom he is not related.
2. You must be sure to enter the informatio for each of the persons in the proper column.

You should watch these points regardless of whether you complete the questionnaire for the related persons first, or (as may occasionally happen) for the unrelated persons first.

4. How to make corrections

Do not erase any entries. If the entry consists of writing on the questionnaire, cross through the original entry and make the new entry above the original one. If the entry consists of checking a box on the questionnaire, correct by circling the box originally checked and then checking the proper box. Do not copy questionnaires over since copying is often a major source of error.

M. The Medical Authorization Form.

1. Explanation to respondent

The Medical Authorization Form must be obtained for each unrelated member of the household who has been in the hospital in the past 5 years or has seen a doctor for any of the conditions listed in Appendix 3 or who has a positive response for question K in Table I.

Complete a Medical Authorization Form for each hospital, doctor or other agency mentioned. Fill in the blanks as indicated on the form.

If the person signs his Authorization in your presence, you may sign as a witness. Otherwise, any adult person may sign as a witness, regardless of whether or not he is a member of the household.

All entries on the Medical Authorization

Form should be made in ink.

2. Items to be filled on the Medical Authorization Form

The following items are to be filled out on the Medical Authorization Form:

1. Signature of the person giving the authorization
2. Address of this person
3. Signature of a witness to the signing
4. Date

If the person signs his Authorization Form in your presence, you may sign as the witness. Otherwise, any adult person may sign as a witness, regardless, of whether or not he is a member of the household.

All entries on the Medical Authorization Form should be made in ink.

N. How to deal with refusals.

1. Refusal on the questionnaire.

Our experience has been that refusals to cooperate by respondents are rare. However, if you have difficulty in obtaining an interview with the household, explain the purpose and importance of the survey, and stress the confidential treatment accorded all information furnished by the respondent. This should be done also at any point during the interview if the respondent should hesitate to answer certain questions.

2. Refusal to sign Medical Authorization Form.

If a respondent gives you the information for the questionnaire but will not sign a Medical Authorization Form, point out that technical medical information is needed, such as the terms for the diagnosis, which can only be obtained from physicians or other sources of record data.

Emphasize again that all information obtained from either the respondent, or physicians and other sources, is accorded confidential treatment. Make sure that the respondent is not left with the feeling that he or she is being checked-up on. It may be helpful to point out that information from physicians and other sources will be obtained on an independent basis, and that no information given in the survey will be revealed.

If any respondent does refuse to sign the Medical Authorization Form, do not persist after you have once explained to him why you wanted it signed. Do not leave the form at the household and do not make any callbacks to the household to obtain a signature Report the failure to sign in item 15 of pag 1 of the questionnaire and turn it in as a completed interview. Do not obtain a signature from an illiterate or person who is unable to understand its purpose.

O. **How to use manual during interview.**

Always carry this instruction manual with you. Despite the fact that you will have become familiar with the instructions before interviewing, some situations may be encountered that will present problems of classification, especially during the beginning of the survey period. In such cases you can usually continue with the interview and refer to your instructions after completion of the interview. However, it is perfectly proper to tell the respondent that you want to check a point, and to consult this manual at any time during the interview.

P. **Review of work.**

Be sure to look over the questionnaire while you are in the house and with the respondent, so that you can ask any additional questions that are needed. This practice will usually avoid the necessity for a later callback to the household.

If your review before turning in the questionnaire shows that any items of information are missing, the respondent must be contacted again as necessary. The use of a telephone for this purpose is permitted.

Part V. ADMINISTRATIVE INSTRUCTIONS AND PROCEDURES

A. Standards of a good interviewer.

A good interviewer satisfies two standards:

1. The information she obtains is complete and correct, and her questionnaires are properly filled out.

2. Her work is done efficiently, and on time.

An interviewer who did perfect work, but who did not complete a satisfactory amount of work, could not be considered a good interviewer since her work would cost too much. On the other hand, neither could an interviewer who rushed through her work to the point of missing information from respondents, or filling out her questionnaires incorrectly or incompletely. This interviewer's work, while cheap enough, might hardly have been worth doing at all.

Thus, both quality and quantity of work are important.

B. Maintaining standards.

The fact that you were selected as an interviewer for this survey following a personal interview shows that you have the basic ability. The forms and procedures for the survey have been designed with the idea of helping you to do your best.

During the course of the survey, advice and assistance will be available at all times from your supervisors in the Boro office. You should feel free to ask for it.

In addition, the quality and quantity of your work will be reviewed on a continuing basis, so that you may know where you stand at all times. Errors you make will be brought to your attention, so that you can prevent their recurrence. If your non-interview rate is too high, or the amount of work completed too low, your supervisors will review the problems and help you work out methods of solving them.

Your supervisors will keep you informed at all times as to standards of performance expected of you.

C. Quality of work.

1. Basic elements

The first essential for achieving high quality work is to be thoroughly familiar with the materials for the survey--the questionnair and this manual. You can expect to have to read this manual more than once to get to know it well; and to use it while at work, especially during the early stages of the survey. Don't make the mistake of assuming that you will learn the definitions and instructions in this manual just by getting more experience with the survey, if there is something that you do not know about, additional interviewing may just give you more practice in doing that thing wrong.

The second essential is what might be called "intelligent persistence". This term implies things such as recognizing when additional questions are needed to clarify a response, and then asking them; or inquiring specifically about an address at which people might live, instead of just checking something like "DU for commercial purposes only." Generally, it means not taking short-cuts in the interview.

Finally, your interviewing technique should be good. There is a lot of worthwhile material on this in Part IV of this manual.

2. Quality checks.

a. Your own review

You can do a great deal yourself toward maintaining the quality of your work by reviewing your schedules before turning them in to the Boro office. A guide for this review is given in Part II of this manual.

b. Office review

The schedules you turn in will also be completely reviewed in the Boro office, and bad ones will be returned to you for correction. Since this would generally mean re-visiting the household to obtain the required information, it could be quite a bit of trouble as well as expensive.

c. Acceptable reject rate.

You should check your reject rate. Initially, not more than 1 questionnaire in 10 should have to be returned to you, and as you get more experience your rate should be less than 1 in 20. If the rate of return to you runs higher than these levels, it is a sign that you should be alerting yourself to the errors you have been making. In any event, if this happens you can expect to hear from your supervisor.

d. Observers

At various times during the survey, and particularly during the early phases, you may be accompanied in your interviewing by an "observer". The observer will be a person from the staff of the Boro office who is specifically experienced in field work. She will discuss your work with you, and answer any questions you may have.

Some interviewers find it a little unsettling to have an observer along. They feel as if she's there to find fault, and that makes them feel defensive and nervous even if their work is actually very good. The observer's visit doesn't mean that anything is necessarily wrong with your work. Her visit is more in the nature of a review and training session.

e. Checks with respondents

All work on the survey will also be subject to direct evaluation be means of independent re-interviews with respondents and other check

3. Non-interviews

A point to be watched very carefully is the number of non-interviews, including refusals you end up with.

a. Danger of non-interviews

Non-interviews can have a very damaging effect on a survey by biasing the results. It has been found, for example, that households which are hard to find at home and interview tend to differ from other households in their characteristics. They tend to be smaller, have fewer or no children, have more working members, and to have less illness. With a high non-interview rate, therefore, the completed households may no longer be representative of the entire population.

b. Acceptable rate

Your non-interview for occupied dwelling units should be less than 1 schedule in 20 (i.e., 5 percent), and no non-interviews is best. If it is higher than 5 percent,you should discuss the problem with your supervisors. In any event, you will hear from them.

The proper reporting of reasons for non-interviews is essential so that the Boro office may arrange for the appropriate type of follow-up. It is also important since information as to the reason for non-interviews is useful in improving the planning of other surveys.

D. Quantity of Work

1. Production standards

Getting the proper amount of good work done on time depends on careful planning and effort

The Boro office will keep you informed at all times as to the average number of schedules you should be completing per day.

The discussion below will give you a number of tips on how to maintain that production rate.

2. Where the interviewer's time goes

When an interviewer isn't completing enough interviews per day, her first reaction is frequently to start skimping on the interview itself. Its obvious that this doesn't make sense in that it immediately reflects on the quality of the survey data. However, it doesn't even make sense from the point of view of how the interviewer's time is actually spent.

The Bureau of the Census has analyzed a large number of surveys to see how much time the various phases take. This study has shown that in a typical survey only about half of the interviewer's time may be spent at the households to be interviewed, and the other half primarily in going from household to household and trying to contact respondents. Of the time spent at the household, only about half may be spent in actually asking the survey questions and recording the respondent answers, and the balance in things such as introducing herself, general conversation and waiting.

It is not surprising, then, that the interviewer who starts skimping the questionnaire ends up by turning in unsatisfactory work without really helping her production.

The most effective ways to conserve time are to plan your calls so as to minimize the need for callbacks, and to maintain a businesslike attitude during the interview.

3. Planning your calls

a. Hours of work

You must adjust your daily hours of work to those times of day when respondents are most likely to be home. Considerable work during the evening hours and on Saturday will be necessary to be sure of finding persons who are not usually at home during the day. Ordinarily, however, you should not plan to interview before 9 o'clock in the morning or after 9 o'clock at night out of consideration for the respondents.

No interviewing is to be done on Sundays or holidays except in special circumstances.

b. Acceptable completion rates

If your hours of work are fairly well planned, you should expect to contact a respondent on your first call for about 60-70 percent of all households. After making one callback, you should expect to have contacted a respondent for 80-90 percent of all households. With experience and careful planning it is possible to raise these rates to 85-90 percent on first call and 95 percent with two calls. Of course, after you have completed the interview for the related members of the household it may be necessary to make further calls for persons not related to the head (roomers, lodgers, etc.)

c. How to plan calls

As far as possible, you should plan to make your calls to neighboring households at one time. Un-planned driving back and forth between unduly separated households is one of the greatest handicaps to interviewer efficiency.

If no one is at home at the time of your first call, try to find out from neighbors, janitors, or superintendents in apartment houses, etc., what time the members of the household are likely to be in. As a general rule, you should not make a callback without some idea of when the household will be in. In the few cases for which you cannot get this information, vary the time of day at which you make you calls.

d. Callbacks limited

You may make up to three calls on any one household in order to obtain an interview. Up to two more calls may be made to obtain an interview for an unrelated member of the household. The first call at a household counts as call No. 1 for the entire household including the unrelated household members.

Questions 20-31 may be asked of a neighbor when 3 calls have not resulted in finding an eligible respondent for the household. Households in this category are to be turned in as non-interviews.

e. Household away for duration

You may find out from neighbors at your first call that a household in the sample is going to be "absent for the duration of the survey" In that case you would turn that questionnaire in as a non-interview. The "duration of the survey" is the duration of the assignment period during which you are working.

4. Business-like attitude

Your greatest asset in conducting an interview efficiently is to be business-like as well as friendly. If a respondent's conversation starts wandering away from the interview, try to cut it off as tactfully as possible -- preferably by asking the next question on the questionnaire. You will also find that you can keep irrelevancies to a minimum by maintaining the tempo of the interview. So far as you yourself are concerned, over-friendliness about the respondent's personal troubles on your part and the volunteering of many unnecessary and unsolicited comments may actually lead to your obtaining less information. It is also, of course, time consumin

E. Your assignment .

You will be given an area of the Boro consisting of a number of blocks which will be your responsibility. By the end of the survey you will have visited every household in this area

1. Turning in work

Turn in the completed schedules daily. to the supervisor in the Boro office. In cases which require you to keep completed schedules in you possession overnight or over the weekend, remember THAT THE INFORMATION IS CONFIDENTIAL AND HANDLE THE SCHEDULES ACCORDINGLY.

F. Interviewer's weekly time and expense sheet.

1. Official record

The Interviewer's Weekly Time and Expense Sheet is your official daily record on which you enter the date, the hours worked, the miles driven and any miscellaneous expense incurred. This report should be turned in at the end of each week.

2. Personnel forms

Each employee must submit a personal application blank and sign a Loyalty Oath stating that she is not a "subversive person" within the meaning of the Pennsylvania Loyalty Act. Each interviewer will fill out the Employees Withholding Exemption Certificate (Form W-4, U. S. Treasury Department, Internal Revenue Service). Social Security numbers are required on this certificate and anyone who does not have a Social Security number should obtain one at the nearest Social Security Board Field Office, (Washington, Pa.)

3. Deductions

Deductions will be made from interviewer's salaries for income tax, Social Security and in cases of persons who reside in a city which has no wage tax, a deduction of one-half of one percent will be made for the city of

Pittsburgh's wage tax. We understand that Donora has a wage tax and so Donora interviewers will not have to pay the Pittsburgh wage tax but are obligated to pay the Donora wage tax directly to the Boro of Donora. This tax will not be deducted by the University of Pittsburgh.

4. Expenses

If interviewers use their personal cars for travel on this study, seven cents a mile will be paid for the gasoline used. Bus fares will also be paid for travel in Donora on official business. Bus fares to and from work at the Donora Boro office will not be paid. Expenses for any telephone calls to the office or other unusual expenses will be paid. Expense accounts for these expenses are to be submitted once a month on the Weekly Time and Expense Sheet referred to in item 1. A copy of this Expense Sheet will be found in the Appendix.

5. Your pay

The University of Pittsburgh pays its employees once a month. The first pay period will be from February 4th through February 28th. The second pay period will be from March 1st through March 31st, or if the survey is completed before the end of March, interviewers will be paid through whatever date is the last day of work. Checks for this period will not be mailed until the 31st of March.

G. Your rights and responsibilities.

You have received a letter of Identification which is evidence that you are an employee of the Graduate School of Public Health of the University of Pittsburgh and are working on the Donora Health Survey. You must present this letter at the beginning of each interview in such a manner that it can easily be read.

1. Language problems

In the case of an occasional family that does not speak English or any language which you can speak, you can usually get along without the aid of a paid interpreter. If you cannot make a particular respondent understand what is wanted, talk to some other adult member of the household; if no member of the household can understand the questions and if the respondent doesn't object, the unpaid assistant of some neighbor of the same nationality should be obtained where possible. If it is not possible to find a neighbor who speaks the language, refer the schedule to a supervisor for action.

2. Obligation to secrecy

You are forbidden under penalty to communicate to any person who is not a member of the Donora Survey staff any information obtained you in the discharge of your official duties. Neither should this information be discussed with other interviewers unless there is official necessity to do so. Be particularly careful when interviewing a household that no person can read the entries you have made for any unrelated persons. You are not permitted to show anyone, other than the members of the staff of the Donora Health Survey having official reasons for seeing them, the schedules that you have filled out; or to retain copies of the schedules or of any information from them. Completed schedules must not be placed where unauthorized persons may have access to them.

3. Not to be accompanied by unauthorized persons

You must not permit anyone to accompany or assist you in the performance of your duties, except members of the staff of the Donora Health Survey. This does not prevent you, however, from receiving unpaid assistance of individuals, when necessary, in order to obtain information concerning persons who do not speak English, or concerning absent households or members of a household.

4. Selling or soliciting not permitted

You are not allowed to combine with your work as interviewer any other occupation, such as collecting information for directory publishers, soliciting subscriptions to newspapers or magazines, or selling or advertising any article whatever.

5. Do not engage in controversial discussions

During the course of your interview with respondents, you are not allowed to engage in any activity or discussion which is not directly related to the work of obtaining the information required in the interview. You may not, for example, leave any cards or other literature or discuss any matter relating to non-survey activities, "special causes", or political candidacy for public office.

6. Receipt and care of supplies

You will be supplied with a portfolio which will contain the forms and other supplies necessary for your work. The portfolio is to be used in your daily work. It will not be necessary to carry in it, on any one day, any more blank forms than will be required for one day's work. Neither will it be necessary to carry in your portfolio any forms completed on previous days. These should have been turned in to the Boro office.

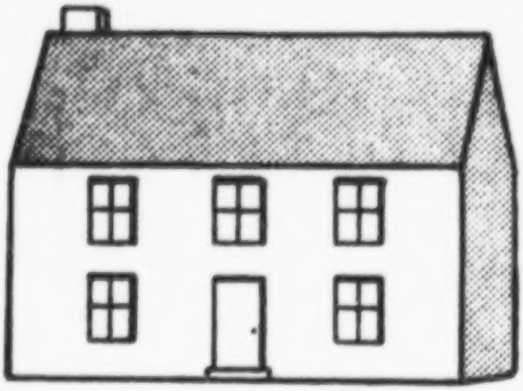
Keep blank forms not in use, and those already filled out but not yet turned in to the Boro office in a safe place where they will not be accessible to unauthorized persons. If additional copies of any forms are needed, obtain them from the Boro office.

All survey materials in your possession at the termination of your employment must be returned to a supervisor at the Boro office.

U. S. DEPARTMENT OF COMMERCE
Bureau of the Census

Appendix I

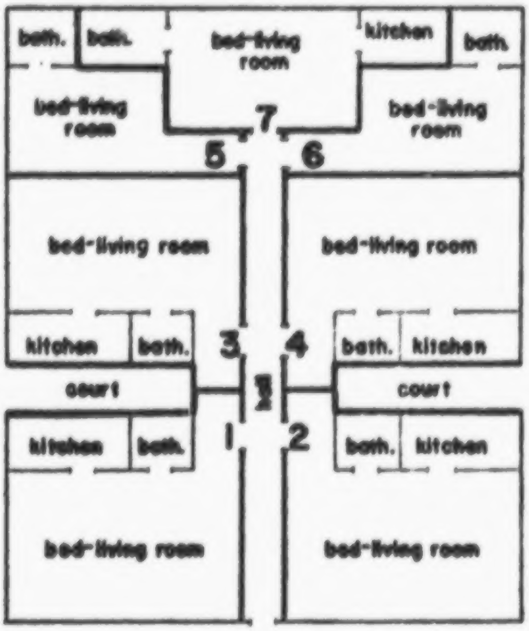
ILLUSTRATIONS OF LIVING QUARTERS



1—Single-family house

A farmer, his wife, and their five small children occupy the whole house.

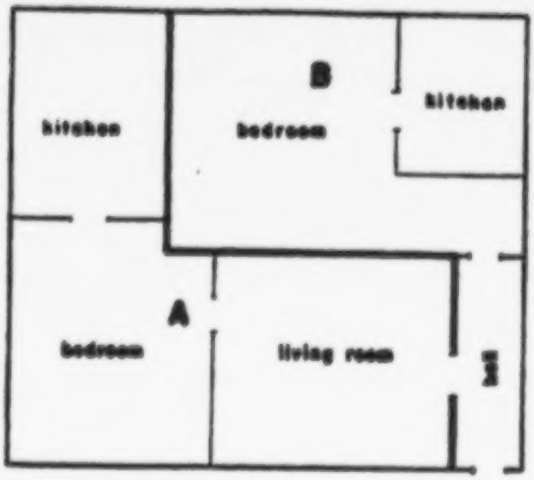
The entire house is occupied by only one family; it is one dwelling unit.


bath.
bath.
bed-living room
kitchen
bath.
bed-living room
7
bed-living room
5
6
bed-living room
bed-living room
kitchen
bath.
3
4
bath.
kitchen
court
court
1
2
kitchen
bath.
bath.
kitchen
bed-living room
bed-living room

2—Regular apartment house

This is a floor of a regular apartment house. Each numbered unit is occupied by a couple or by a person living alone.

Apartments 1, 2, 3, 4, and 7 have separate cooking equipment and therefore are separate dwelling units. Apartments 5 and 6 are one-room apartments in a regular apartment house and are separate dwelling units even though they have no separate cooking equipment and consist of only one room.


kitchen
B
bedroom
kitchen
A
bedroom
living room
hall

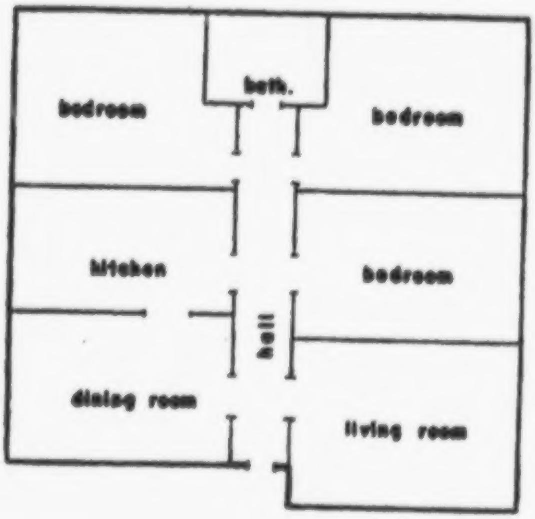
3—House with related family group—two dwelling units

A widowed mother occupies the three rooms labeled A. She has a coal stove which she uses for cooking.

Her son and his wife live here, too, but they have two rooms of their own, labeled B. The son and wife cook their meals on their 3-burner electric hotplate.

A and B are separate dwelling units because each has separate cooking equipment. (A has a regular stove, and B has a hotplate which the occupants use for preparing meals.)

4—House with related family group and lodgers—one dwelling unit

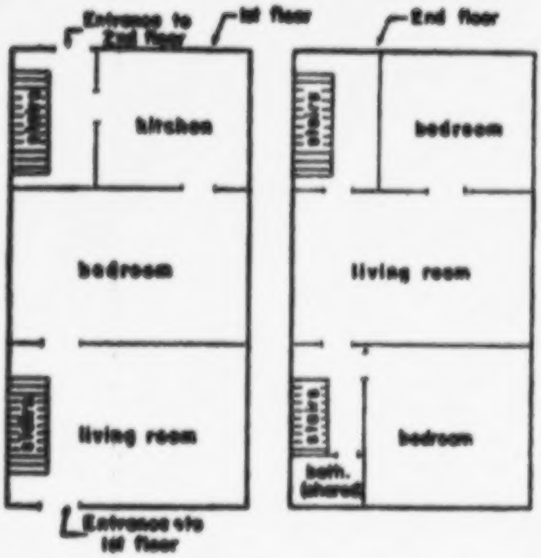

bedroom
bath.
bedroom
kitchen
bedroom
hall
dining room
living room

This house is occupied by a man and his wife, their married daughter and her husband, and two lodgers.

The married daughter and her husband do not have their own cooking equipment nor do they have exclusive use of two or more rooms with separate entrance. The lodgers share one room and have no cooking equipment.

Neither the younger couple nor the lodgers have a separate dwelling unit. Their quarters are combined with the quarters of the head and wife, and the combined quarters contain fewer than 10 lodgers.

The entire house constitutes one dwelling unit.


Entrance to 2nd floor
1st floor
2nd floor
stairs
kitchen
bedroom
bedroom
living room
stairs
living room
stairs
bedroom
bath. (shared)
Entrance to 1st floor

5—Dwelling units with two or more rooms and separate entrance

A man and his wife occupy the rooms on the first floor. A married couple and their daughter occupy the three rooms on the second floor. Although the two families cook at different times and eat separately, they use the same kitchen. Each of the quarters has its own entrance.

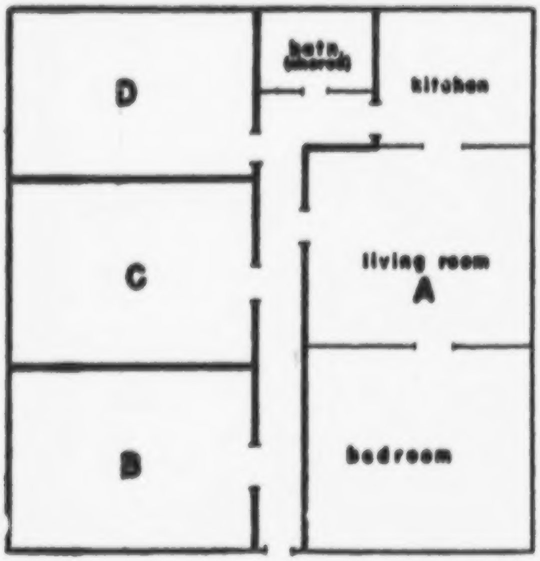
Neither the first-floor unit nor the second-floor unit has separate cooking equipment. However, each of the quarters is a separate dwelling unit because each has two or more rooms and a separate entrance. (For the count of rooms, the shared kitchen is counted with the first-floor unit.)

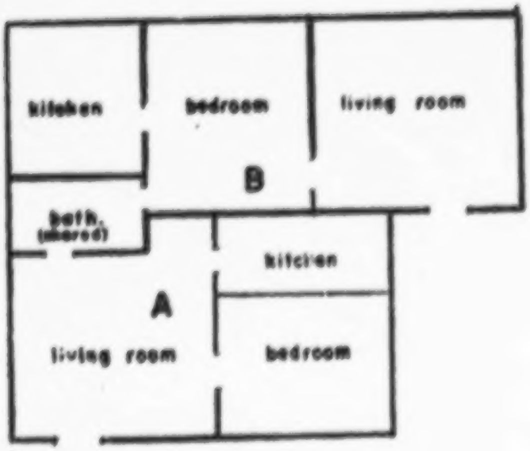
6—One-room dwelling units with separate cooking equipment

The owner converted his house to accommodate several families. He kept three rooms (labeled A) including a kitchen with a gas range, for his own use. He furnished the remaining rooms, B, C, and D, as studio rooms with 2-burner gas hotplates for cooking.

A mother and daughter live in B, a man and his wife in C, and one woman in D. The woman in D seldom cooks but the occupants of the other quarters use their stoves for preparing practically all their meals.

Each of the four quarters is a separate dwelling unit because each has separate cooking equipment. (A has a regular gas range; B and C have hotplates which the occupants use for preparing meals; and the hotplate in D is considered separate cooking equipment because most of the quarters in the structure have cooking equipment for preparing meals.)


bath. (shared)
D
kitchen
C
living room
A
B
bedroom

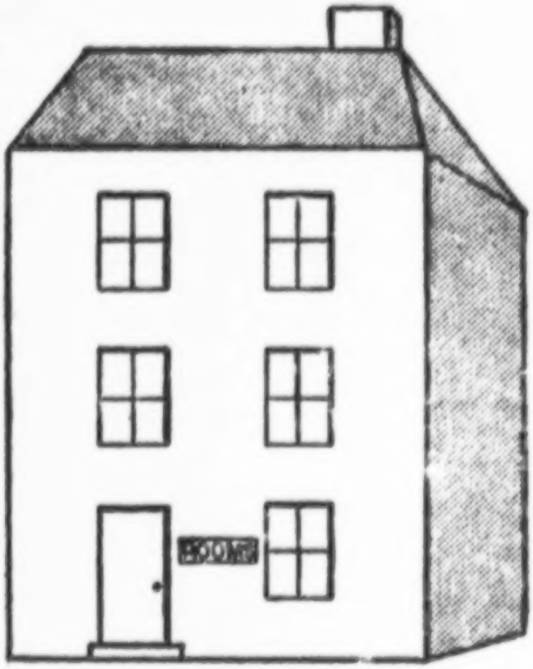


7—Vacant dwelling unit

A man, his wife, and son occupy the three rooms labeled A. They have a regular gas stove for cooking.

The wife says there are three vacant rooms in the back (labeled B). The previous tenants in B had their own gas range which they took with them. The new tenants will move in tomorrow.

A and B are separate dwelling units because each has separate cooking equipment. (The vacant dwelling unit B is considered as having separate cooking equipment because the previous occupants had a regular range for cooking.)



8—Large rooming house—nondwelling-unit quarters

The landlady has a room and kitchen on the first floor. She sublets the remaining 11 rooms in the house as sleeping rooms, with one person occupying each room.

The woman in room 6 has a 1-burner electric hotplate which she uses for occasional snacks. The other roomers have no cooking facilities.

None of the lodgers' quarters are separate dwelling units because none have separate cooking equipment or two or more rooms with separate entrance. (Room 6 is not considered as having separate cooking equipment; it has only a hotplate for occasional use.)

The lodgers' quarters are combined with the landlady's quarters. Because the combined quarters of the head and lodgers contain "10 or more lodgers," enumerate the combination as one nondwelling-unit quarters.

APPENDIX II

LISTING SHEET NUMBER ______ INTERVIEWER ______________

AREA ______________ DATE ______________

Listing Unit			No. of Dwelling Units in this List Unit		Household Serial Number (6)	1957 Sample Household (7)
Line (1)	Serial Number (2)	Address or Addresses (3)	Occupied (4)	Not Occupied (5)		
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

APPENDIX III

APPENDIX III

MEDICAL AUTHORIZATION FORM
Graduate School of Public Health
University of Pittsburgh

Doctor ____________________

Hospital ____________________

Other ____________________

is hereby granted my permission to describe and deliver to the Graduate School of Public Health of the University of Pittsburgh any and all information in the case records of ____________________ (name of patient) when patient was treated at any time. Such information disclosed or delivered may include the complete case history as shown by the records and any other information in the possession of the above relating to my ____________________ (own, son, daughter, wife, husband, etc.) condition.

Signed ____________________

Witness ____________________

Address ____________________

Date ____________________

Relation, if not patient ___

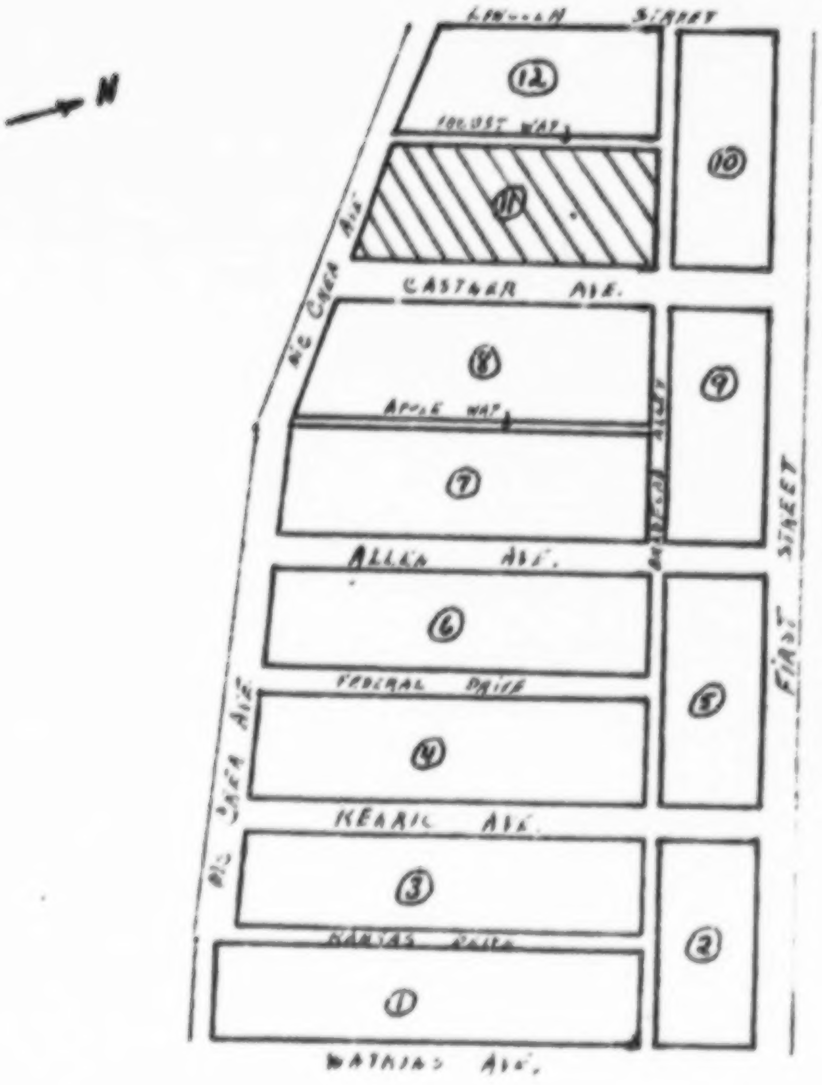
APPENDIX IV
DONORA HEALTH STUDY
WEEKLY TIME AND EXPENSE SHEET

INTERVIEWER ______________________________

DATE	HOURS WORKED	MILES DRIVEN	MISCELLANEOUS EXPENSE

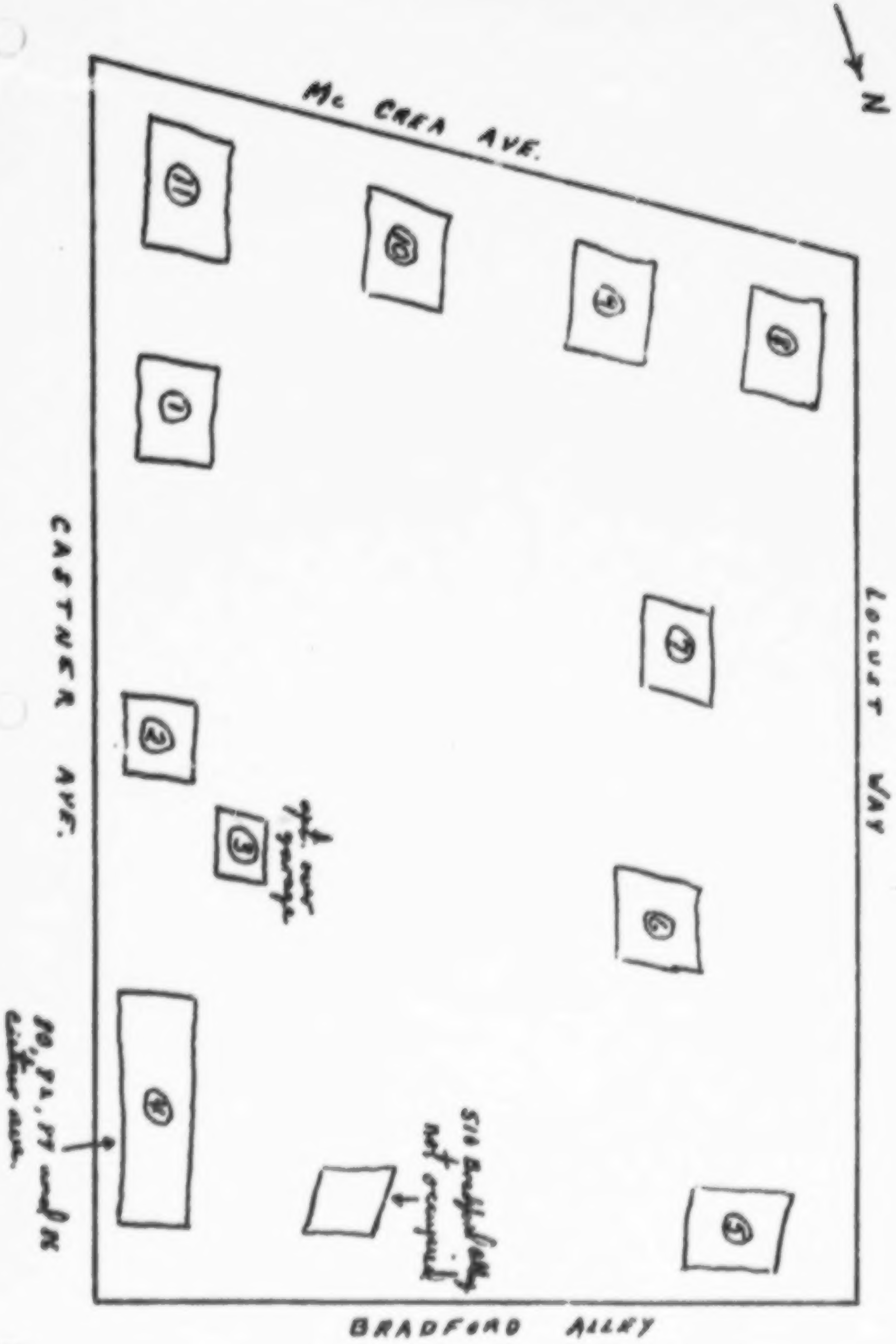
APPENDIX VI

AREA B
INTERVIEWER T. Jones


N
LINCOLN STREET
LOCUST WAY
BIG CREEK AVE.
CASTNER AVE.
APPLE WAY
ALLEY
ALLEN AVE.
FEDERAL DRIVE
KEARIC AVE.
KANSAS DRIVE
WATKINS AVE.
FIRST STREET
1
2
3
4
5
6
7
8
9
10
11
12

Specimen Area Assignment for an Interviewer. Note the serpentine numbering of the blocks. You will number the blocks in your Area. Indicate in the blanks at the top of the sheet the area letter and sign your name.

APPENDIX VII 166<


N
Mc CREA AVE.
CASTNER AVE.
LOCUST WAY
BRADFORD ALLEY
11
10
9
8
1
7
2
3
6
4
5
Apt. over garage
510 Bradford Alley not occupied

INTERVIEWER T. [illegible]
AREA 8
LISTING SHEET 7
BLOCK 11

Specimen Block Sketch

APPENDIX C

1. The personal interview questionnaire
2. The chronic disease and symptom check list
3. The mailed questionnaire

CONFIDENTIAL

The Information obtained from this Schedule will be accorded confidential treatment by the Graduate School of Public Health of the University of Pittsburgh. Individual reports will be seen only by technical personnel authorized to make statistical analyses of the data.

DONORA HEALTH STUDY

February 1957

1. HOUSEHOLD NUMBER

2. ADDRESS (Enter House Number and Street, Apt. No. and Other Identification)

3. LISTING SHEET REFERENCE

SHEET_____ LINE_____

4. NO. OF OCCUPIED DWELLING UNITS AT THIS ADDRESS

NUMBER_____

5. INTERVIEWER

6. IDENTIFICATION OF RESPONDENT:

QUESTIONS 20-31		QUESTIONS 32-42 OR 47	
RESPONDENT	RELATION TO HOUSEHOLD HEAD	RESPONDENT	RESPONDED FOR

7. RECORD OF CALLS FOR:

	DATE OF CALL		
	1	2	3
HOUSEHOLD			
1948 SAMPLE PERSON			
OTHER			

8. IF INTERVIEW FOR ALL MEMBERS OF HOUSEHOLD NOT COMPLETED ON FIRST CONTACT WITH ELIGIBLE RESPONDENT, WHAT WAS THE REASON?

9. BEST TIME TO CALL

10. TELEPHONE NUMBER

11. NAME OF CONTACT

12. INTERVIEW REASSIGNED TO:

13. DATE

14. REMARKS

15. COMPLETION RECORD FOR:		REQUIRED	DATE COMPLETED	REMARKS
CENSUS	ITEMS 20-31			
1957 SAMPLE HOUSEHOLD	ITEMS 20-42			
1948 SAMPLE PERSON	ITEMS 20-47			
MEDICAL AUTHORIZATION FORM FOR INDIVIDUALS NO.	_____ _____ _____			

16. SCHEDULE_____OF_____SCHEDULES

17. FIELD REVIEW BY: DATE:

18. EDITED BY: DATE:

19. REVIEW COMMENTS

20. a. WHAT IS THE NAME OF THE HEAD OF THIS HOUSEHOLD? (Enter Name in First Column.) b. WHAT ARE THE NAMES OF ALL OTHER PERSONS WHO LIVE HERE? (List all Persons who usually live here, and all Persons staying here who have no usual place of residence elsewhere. List these Persons in prescribed order.) c. IS THERE ANYONE ELSE LIVING HERE? ANY BABIES? ANY LODGERS? (If Yes to any part add missed Persons to the Questionnaire.) d. HAVE WE MISSED ANYONE WHO IS AWAY ON BUSINESS? AT SCHOOL? ON A VISIT? TEMPORARILY IN A HOSPITAL? (If Yes, add Missed Person to Schedule if Person meets definition of Household Member)	LAST NAME (1) FIRST NAME INITIAL	LAST FIRST
21. HOW ARE YOU RELATED TO THE HEAD OF THE HOUSEHOLD? (Enter relationship to Head; e.g., Head, Wife, Daughter, Mother-in-Law, Lodger, etc.)	RELATIONSHIP	RELAT
22. RACE (Do not ask, check one box for each Person)	☐ WHITE ☐ NEGRO ☐ OTHER	☐ W ☐ O
23. SEX (Check one box for each Person.)	☐ MALE ☐ FEMALE	☐ M
24. HOW OLD WERE YOU ON YOUR LAST BIRTHDAY? (If under one year of age, enter month of birth instead of Age, e.g., May, June.)	AGE	AGE
25. ARE YOU NOW MARRIED, WIDOWED, DIVORCED, SEPARATED, OR NEVER MARRIED? (Check one box for each Person, if under 14 years check Never Married.)	☐ MARRIED ☐ DIVORCED ☐ WIDOWED ☐ SEPARATED ☐ NEVER MARRIED	☐ M ☐ W
26. WHAT WAS YOUR FULL NAME IN OCTOBER, 1948?	☐ SAME ☐ NOT BORN 1948 NAME:	☐ SA 1948
27. WHAT WAS YOUR ADDRESS IN OCTOBER, 1948?	☐ SAME ☐ NOT BORN 1948 ADDRESS:	☐ SA 1948
28. WHAT WAS THE NAME OF THE HEAD OF THE HOUSEHOLD IN WHICH YOU LIVED IN OCTOBER, 1948?	NAME ☐ NOT BORN ☐ SAME	NAME ☐ SA
29. (Do not ask.) IS THIS A 1948 SAMPLE PERSON? (Check each Name in Item 20 in the Alphabetical Section of the 1948 Sample List.)	☐ YES ☐ NO ☐ NOT BORN	☐ YE
34. WHAT IS YOUR JOB OR OCCUPATION?		
35. WHERE DO YOU WORK? (If Industrial Work, name of Firm, Plant and Department.)		
36. WHAT OTHER OCCUPATION OR EMPLOYERS HAVE YOU HAD? (Record last previous occupation and work back through time. Indicate how long each job was held and place of work.) JOB PLACE WHEN		
JOB PLACE WHEN		
37. HAVE YOU EVER SMOKED CIGARETTES, CIGARS, OR A PIPE?	☐ YES ☐ NO	☐ YE
38. HOW MANY YEARS HAVE YOU SMOKED?	YEARS	YEARS
39. HOW MANY CIGARETTES DO YOU SMOKE A DAY ON THE AVERAGE?	☐ NONE ____ PER DAY	☐ NO
NOW I WOULD LIKE TO ASK SOME QUESTIONS ABOUT YOUR HEALTH: DISABLEMENT LIST — 40. IS ANY MEMBER OF THIS HOUSEHOLD DISABLED IN ANY OF THE WAYS LISTED ON THE CARD? IN WHICH WAY? WHEN DID THE DISABLEMENT BEGIN? WHAT WAS THE REASON?	☐ NONE ONSET REASON a b c d e f g h	☐ NO a b e f
CHRONIC CONDITIONS LIST — 41. DO YOU HAVE ANY OF THESE CHRONIC CONDITIONS OR AILMENTS EVEN THOUGH THEY MAY NOT BOTHER YOU ALL THE TIME? WHICH ONES?	☐ NONE a b c d e f g h i j k	☐ NO
SYMPTOMS LIST — 42. DO YOU HAVE ANY OF THE SYMPTONS LISTED ON THE REVERSE SIDE OF THE CARD? WHICH ONES?	☐ NONE	☐ NO
ASK THE REMAINING QUESTIONS ONLY FOR PERSONS WITH "YES" CHECKED IN ITEM 29.		
43. ARE YOU UNDER A DOCTOR'S CARE NOW? (If Yes) FOR WHAT REASON?	☐ YES ☐ NO ↳ENTER IN TABLE 1	☐ YE
44. (If any condition or Symptom mentioned in Item 41 or 42) DID YOU SEE A DOCTOR ABOUT ____? WHAT DID THE DOCTOR SAY IT WAS?	☐ YES ☐ NO ↳ENTER IN TABLE 1	☐ YE
45. HAVE YOU BEEN ILL FROM ANY OTHER CAUSE SINCE OCTOBER, 1948, WHICH REQUIRED YOU TO SEE A DOCTOR? (If Yes) WHAT DID THE DOCTOR SAY IT WAS?	☐ YES ☐ NO ↳ENTER IN TABLE	☐ YE
46. HAVE YOU BEEN IN A HOSPITAL OVERNIGHT OR LONGER SINCE OCTOBER, 1948? WHEN DID YOU ENTER THE HOSPITAL?	☐ YES ☐ NO ↳ENTER IN TABLE 2	☐ YE

	23. SEX (Check one box for each Person.)	☐ MALE ☐ FEMALE	☐ M
	24. HOW OLD WERE YOU ON YOUR LAST BIRTHDAY? (If under one year of age, enter month of birth instead of Age, e.g., May, June.)	AGE	AGE
	25. ARE YOU NOW MARRIED, WIDOWED, DIVORCED, SEPARATED, OR NEVER MARRIED? (Check one box for each Person, if under 14 years check Never Married.)	☐ MARRIED ☐ DIVORCED ☐ WIDOWED ☐ SEPARATED ☐ NEVER MARRIED	☐ MA ☐ W
	26. WHAT WAS YOUR FULL NAME IN OCTOBER, 1948?	☐ SAME ☐ NOT BORN 1948 NAME:	☐ SA 1948
	27. WHAT WAS YOUR ADDRESS IN OCTOBER, 1948?	☐ SAME ☐ NOT BORN 1948 ADDRESS:	☐ SA 1948
	28. WHAT WAS THE NAME OF THE HEAD OF THE HOUSEHOLD IN WHICH YOU LIVED IN OCTOBER, 1948?	NAME ☐ NOT BORN ☐ SAME	NAME ☐ SA
	29. (Do not ask.) IS THIS A 1948 SAMPLE PERSON? (Check each Name in Item 20 in the Alphabetical Section of the 1948 Sample List.)	☐ YES ☐ NO ☐ NOT BORN	☐ YES
	34. WHAT IS YOUR JOB OR OCCUPATION?		
	35. WHERE DO YOU WORK? (If Industrial Work, name of Firm, Plant and Department.)		
	36. WHAT OTHER OCCUPATION OR EMPLOYERS HAVE YOU HAD? (Record last previous occupation and work back through time. Indicate how long each job was held and place of work.) JOB PLACE WHEN JOB PLACE WHEN		
	37. HAVE YOU EVER SMOKED CIGARETTES, CIGARS, OR A PIPE?	☐ YES ☐ NO	☐ YES
	38. HOW MANY YEARS HAVE YOU SMOKED?	YEARS	YEARS
	39. HOW MANY CIGARETTES DO YOU SMOKE A DAY ON THE AVERAGE?	☐ NONE _____ PER DAY	☐ NON
	NOW I WOULD LIKE TO ASK SOME QUESTIONS ABOUT YOUR HEALTH:		
DISABLEMENT LIST	40. IS ANY MEMBER OF THIS HOUSEHOLD DISABLED IN ANY OF THE WAYS LISTED ON THE CARD? IN WHICH WAY? WHEN DID THE DISABLEMENT BEGIN? WHAT WAS THE REASON?	☐ NONE ONSET _____ REASON: a b c d e f g h	☐ NON a b c e f
CHRONIC CONDITIONS LIST	41. DO YOU HAVE ANY OF THESE CHRONIC CONDITIONS OR AILMENTS EVEN THOUGH THEY MAY NOT BOTHER YOU ALL THE TIME? WHICH ONES?	☐ NONE a b c d e f g h i j k	☐ NON
SYMPTOMS LIST	42. DO YOU HAVE ANY OF THE SYMPTONS LISTED ON THE REVERSE SIDE OF THE CARD? WHICH ONES?	☐ NONE	☐ NON
	ASK THE REMAINING QUESTIONS ONLY FOR PERSONS WITH "YES" CHECKED IN ITEM 29.		
	43. ARE YOU UNDER A DOCTOR'S CARE NOW? (If Yes) FOR WHAT REASON?	☐ YES ☐ NO →ENTER IN TABLE 1	☐ YES
	44. (If any condition or Symptom mentioned in Item 41 or 42) DID YOU SEE A DOCTOR ABOUT _______ ? WHAT DID THE DOCTOR SAY IT WAS?	☐ YES ☐ NO →ENTER IN TABLE 1	☐ YES
	45. HAVE YOU BEEN ILL FROM ANY OTHER CAUSE SINCE OCTOBER, 1948, WHICH REQUIRED YOU TO SEE A DOCTOR? (If Yes) WHAT DID THE DOCTOR SAY IT WAS?	☐ YES ☐ NO →ENTER IN TABLE [illegible]	☐ YES
	46. HAVE YOU BEEN IN A HOSPITAL OVERNIGHT OR LONGER SINCE OCTOBER, 1948? WHEN DID YOU ENTER THE HOSPITAL?	☐ YES ☐ NO →ENTER IN TABLE 2	☐ YES
	47. DID YOU BECOME ILL DURING THE SMOG EPISODE IN OCTOBER, 1948?	☐ YES ☐ NO	☐ YES

(1)	LAST NAME (2)	LAST NAME (3)	LAST NAME (4)	LAST NAME (5)
NITIAL	FIRST NAME INITIAL	FIRST NAME INITIAL	FIRST NAME INITIAL	FIRST NAME INITIAL
	RELATIONSHIP	RELATIONSHIP	RELATIONSHIP	RELATIONSHIP
GRO	☐ WHITE ☐ NEGRO ☐ OTHER	☐ WHITE ☐ NEGRO ☐ OTHER	☐ WHITE ☐ NEGRO ☐ OTHER	☐ WHITE ☐ NEGRO ☐ OTHER
ALE	☐ MALE ☐ FEMALE	☐ MALE ☐ FEMALE	☐ MALE ☐ FEMALE	☐ MALE ☐ FEMALE
	AGE	AGE	AGE	AGE
ORCED ARATED D	☐ MARRIED ☐ DIVORCED ☐ WIDOWED ☐ SEPARATED ☐ NEVER MARRIED	☐ MARRIED ☐ DIVORCED ☐ WIDOWED ☐ SEPARATED ☐ NEVER MARRIED	☐ MARRIED ☐ DIVORCED ☐ WIDOWED ☐ SEPARATED ☐ NEVER MARRIED	☐ MARRIED ☐ DIVORCED ☐ WIDOWED ☐ SEPARATED ☐ NEVER MARRIED
T BORN	☐ SAME ☐ NOT BORN 1948 NAME:	☐ SAME ☐ NOT BORN 1948 NAME:	☐ SAME ☐ NOT BORN 1948 NAME:	☐ SAME ☐ NOT BORN 1948 NAME:
T BORN	☐ SAME ☐ NOT BORN 1948 ADDRESS:	☐ SAME ☐ NOT BORN 1948 ADDRESS:	☐ SAME ☐ NOT BORN 1948 ADDRESS:	☐ SAME ☐ NOT BORN 1948 ADDRESS:
T BORN	NAME ☐ NOT BORN ☐ SAME	NAME ☐ NOT BORN ☐ SAME	NAME ☐ NOT BORN ☐ SAME	NAME ☐ NOT BORN ☐ SAME
D	☐ YES ☐ NO ☐ NOT BORN	☐ YES ☐ NO ☐ NOT BORN	☐ YES ☐ NO ☐ NOT BORN	☐ YES ☐ NO ☐ NOT BORN
D	☐ YES ☐ NO	☐ YES ☐ NO	☐ YES ☐ NO	☐ YES ☐ NO
	YEARS	YEARS	YEARS	YEARS
PER DAY	☐ NONE ____ PER DAY	☐ NONE ____ PER DAY	☐ NONE ____ PER DAY	☐ NONE ____ PER DAY
T___ ___ N:	☐ NONE ONSET ____ REASON: a b c d e f g h	☐ NONE ONSET ____ REASON: a b c d e f g h	☐ NONE ONSET ____ REASON: a b c d e f g h	☐ NONE ONSET ____ REASON. a b c d e f g h
d e j k	☐ NONE a b c d e f g h i j k	☐ NONE a b c d e f g h i j k	☐ NONE a b c d e f g h i j k	☐ NONE a b c d e f g h i j k
	☐ NONE	☐ NONE	☐ NONE	☐ NONE
D 1	☐ YES ☐ NO ↳ENTER IN TABLE 1	☐ YES ☐ NO ↳ENTER IN TABLE 1	☐ YES ☐ NO ↳ENTER IN TABLE 1	☐ YES ☐ NO ↳ENTER IN TABLE 1
D 1	☐ YES ☐ NO ↳ENTER IN TABLE 1	☐ YES ☐ NO ↳ENTER IN TABLE 1	☐ YES ☐ NO ↳ENTER IN TABLE 1	☐ YES ☐ NO ↳ENTER IN TABLE 1
O	☐ YES ☐ NO ↳ENTER IN TABLE 1	☐ YES ☐ NO ↳ENTER IN TABLE 1	☐ YES ☐ NO ↳ENTER IN TABLE 1	☐ YES ☐ NO ↳ENTER IN TABLE 1
	☐ YES ☐ NO	☐ YES ☐ NO	☐ YES ☐ NO	☐ YES ☐ NO

O	☐ WHITE ☐ NEGRO ☐ OTHER	☐ WHITE ☐ NEGRO ☐ OTHER	☐ WHITE ☐ NEGRO ☐ OTHER	☐ WHITE ☐ NEGRO ☐ OTHER
LE	☐ MALE ☐ FEMALE	☐ MALE ☐ FEMALE	☐ MALE ☐ FEMALE	☐ MALE ☐ FEMALE
	AGE	AGE	AGE	AGE
RCED RATED	☐ MARRIED ☐ DIVORCED ☐ WIDOWED ☐ SEPARATED ☐ NEVER MARRIED	☐ MARRIED ☐ DIVORCED ☐ WIDOWED ☐ SEPARATED ☐ NEVER MARRIED	☐ MARRIED ☐ DIVORCED ☐ WIDOWED ☐ SEPARATED ☐ NEVER MARRIED	☐ MARRIED ☐ DIVORCED ☐ WIDOWED ☐ SEPARATED ☐ NEVER MARRIED
BORN	☐ SAME ☐ NOT BORN 1948 NAME:	☐ SAME ☐ NOT BORN 1948 NAME:	☐ SAME ☐ NOT BORN 1948 NAME:	☐ SAME ☐ NOT BORN 1948 NAME:
BORN	☐ SAME ☐ NOT BORN 1948 ADDRESS:	☐ SAME ☐ NOT BORN 1948 ADDRESS:	☐ SAME ☐ NOT BORN 1948 ADDRESS:	☐ SAME ☐ NOT BORN 1948 ADDRESS:
BORN	NAME ☐ NOT BORN ☐ SAME	NAME ☐ NOT BORN ☐ SAME	NAME ☐ NOT BORN ☐ SAME	NAME ☐ NOT BORN ☐ SAME
	☐ YES ☐ NO ☐ NOT BORN	☐ YES ☐ NO ☐ NOT BORN	☐ YES ☐ NO ☐ NOT BORN	☐ YES ☐ NO ☐ NOT BORN
	☐ YES ☐ NO	☐ YES ☐ NO	☐ YES ☐ NO	☐ YES ☐ NO
	YEARS	YEARS	YEARS	YEARS
R DAY	☐ NONE ___ PER DAY	☐ NONE ___ PER DAY	☐ NONE ___ PER DAY	☐ NONE ___ PER DAY
	☐ NONE ONSET ___ REASON: a b c d e f g h	☐ NONE ONSET ___ REASON: a b c d e f g h	☐ NONE ONSET ___ REASON: a b c d e f g h	☐ NONE ONSET ___ REASON. a b c d e f g h
d e j k	☐ NONE a b c d e f g h i j k	☐ NONE a b c d e f g h i j k	☐ NONE a b c d e f g h i j k	☐ NONE a b c d e f g h i j k
	☐ NONE	☐ NONE	☐ NONE	☐ NONE
	☐ YES ☐ NO ↳ENTER IN TABLE 1	☐ YES ☐ NO ↳ENTER IN TABLE 1	☐ YES ☐ NO ↳ENTER IN TABLE 1	☐ YES ☐ NO ↳ENTER IN TABLE 1
	☐ YES ☐ NO ↳ENTER IN TABLE 1	☐ YES ☐ NO ↳ENTER IN TABLE 1	☐ YES ☐ NO ↳ENTER IN TABLE 1	☐ YES ☐ NO ↳ENTER IN TABLE 1
	☐ YES ☐ NO ↳ENTER IN TABLE 1	☐ YES ☐ NO ↳ENTER IN TABLE 1	☐ YES ☐ NO ↳ENTER IN TABLE 1	☐ YES ☐ NO ↳ENTER IN TABLE 1
	☐ YES ☐ NO ↳ENTER IN TABLE 2	☐ YES ☐ NO ↳ENTER IN TABLE 2	☐ YES ☐ NO ↳ENTER IN TABLE 2	☐ YES ☐ NO ↳ENTER IN TABLE 2
	☐ YES ☐ NO	☐ YES ☐ NO	☐ YES ☐ NO	☐ YES ☐ NO

TABLE 1

LINE NUMBER	COL. NO. OF PERSON (a)	QUESTION NUMBER (b)	WHAT DID THE DOCTOR SAY IT WAS — DID HE USE ANY MEDICAL TERMS? (c)	WHEN WAS A DOCTOR LAST SEEN ABOUT ___? (Month, Year) (d)	WHAT IS THE DOCTOR'S NAME AND ADDRESS? (Enter Full Name and Complete Address if Outside Donora) (e)	DO YOU HAVE CHRONIC OR REPEATED TROUBLE (with) (Because of ___? (f)	WHE YOU FI NOTICE THIS CONDITION? (Month, Year) (g)	DAYS A IN THE DID ___ FRO USUAL
1						☐ C.C. NO ☐ ▼ ☐ YES SKIP TO (k)		
2						☐ C.C. NO ☐ ▼ ☐ YES SKIP TO (k)		
3						☐ C.C. NO ☐ ▼ ☐ YES SKIP TO (k)		
4						☐ C.C. NO ☐ ▼ ☐ YES SKIP TO (k)		
5						☐ C.C. NO ☐ ▼ ☐ YES SKIP TO (k)		
6						☐ C.C. NO ☐ ▼ ☐ YES SKIP TO (k)		
7						☐ C.C. NO ☐ ▼ ☐ YES SKIP TO (k)		

TABLE 2

LINE NUMBER	COL. NO. OF PERSON (a)	QUESTION NUMBER (b)	WHEN DID YOU ENTER THE HOSPITAL? (Month, Year) (c)	FOR WHAT CONDITION DID YOU ENTER THE HOSPITAL? (d)	WHAT IS THE NAME AND ADDRESS OF THE HOSPITAL? (Include City and State where necessary) (e)
1					
2					
3					

LINE NUMBER	COL. NO. OF PERSON (a)
4	
5	
6	

CE ION? th, r))	UT HOW MANY DAYS ALTOGETHER IN THE PAST YEAR DID ________ KEEP YOU FROM YOUR USUAL ACTIVITIES? (h)	HOW OFTEN DO YOU SEE A DOCTOR ABOUT ________? (i)	DO YOU TAKE MEDICINE OR TREATMENTS FOR ________ REGULARLY, ONCE IN A WHILE, OR NOT AT ALL? (j)	SINCE 1948 HAS THIS CONDITION CAUSED YOU TO LOSE TIME FROM WORK OR TO SUBMIT A MEDICAL INSURANCE OR BENEFIT CLAIM? (Enter Details) (k)
		☐ FREQUENTLY ☐ OCCASIONALLY ☐ RARELY	☐ REGULARLY ☐ OCCASIONALLY ☐ NOT AT ALL	
		☐ FREQUENTLY ☐ OCCASIONALLY ☐ RARELY	☐ REGULARLY ☐ OCCASIONALLY ☐ NOT AT ALL	
		☐ FREQUENTLY ☐ OCCASIONALLY ☐ RARELY	☐ REGULARLY ☐ OCCASIONALLY ☐ NOT AT ALL	
		☐ FREQUENTLY ☐ OCCASIONALLY ☐ RARELY	☐ REGULARLY ☐ OCCASIONALLY ☐ NOT AT ALL	
		☐ FREQUENTLY ☐ OCCASIONALLY ☐ RARELY	☐ REGULARLY ☐ OCCASIONALLY ☐ NOT AT ALL	
		☐ FREQUENTLY ☐ OCCASIONALLY ☐ RARELY	☐ REGULARLY ☐ OCCASIONALLY ☐ NOT AT ALL	
		☐ FREQUENTLY ☐ OCCASIONALLY ☐ RARELY	☐ REGULARLY ☐ OCCASIONALLY ☐ NOT AT ALL	

LINE NUMBER	COL. NO. OF PERSON (a)	QUESTION NUMBER (b)	WHEN DID YOU ENTER THE HOSPITAL? (Month, Year) (c)	FOR WHAT CONDITION DID YOU ENTER THE HOSPITAL? (d)	WHAT IS THE NAME AND ADDRESS OF THE HOSPITAL? (Include City and State where necessary) (e)
4					
5					
6					

GRADUATE SCHOOL OF PUBLIC HEALTH
UNIVERSITY OF PITTSBURGH
DONORA HEALTH STUDY

DISABLEMENT AND CHRONIC CONDITIONS

DISABLEMENT

WILL YOU PLEASE LOOK OVER THE FOLLOWING DESCRIPTIONS AND INDICATE WHETHER ANY OF THESE DESCRIPTIONS APPLY TO ANY MEMBER OF THIS HOUSEHOLD.

A. CONFINED TO BED
B. USES A WHEEL CHAIR
C. REQUIRES SOMEONE'S HELP TO WALK
D. WALKS WITH AID OF CRUTCH OR CANE
E. REQUIRES HELP TO CLIMB OR DESCEND STAIRS
F. CONFINED TO THE HOUSE
G. FED BY SOMEONE ELSE
H. REQUIRES HELP TO DRESS, UNDRESS, SHAVE, BATHE, BRUSH TEETH, COMB HAIR, ETC.

CHRONIC DISEASES AND CONDITIONS

A. RHEUMATISM AND ARTHRITIS
B. HEART DISEASE
C. RHEUMATIC FEVER
D. HIGH BLOOD PRESSURE
E. DIABETES (SUGAR IN THE URINE)
F. CHRONIC BRONCHITIS
G. CHRONIC SINUS TROUBLE
H. ASTHMA
I. KIDNEY TROUBLE
J. HARDENING OF THE ARTERIES
K. HERNIA – RUPTURE

170:

GRADUATE SCHOOL OF PUBLIC HEALTH

University Of Pittsburgh

Donora Health Study

Symptoms and Conditions

On this side of the card is a list of symptoms and conditions in which we are interested Please look over the list and tell me if you have had any of these symptoms at any time since 1948 even if they are not bothering you now and you have not seen a doctor for them.

A. High blood pressure
B. Low blood pressure
C. Pain over heart
D. Thumping heart
E. Any other heart trouble (specify)
F. Short of breath easily
G. Short of breath lying down
H. Swollen ankles at night
I. Blacking out
J. Spots before the eyes
K. Dizzy spells
L. Frequent sore throats
M. Hoarse for a long time
N. Nose continually stuffed up
O. Constantly running nose
P. Continuous severe colds
Q. Heavy chest colds
R. Severe pains in the chest
S. Severe soaking sweats at night
T. Chronic chest condition
U. Eye irritation

CONFIDENTIAL

The information obtained from this schedule will be accorded confidential treatment by the Graduate School of Public Health of the University of Pittsburgh. Individual reports will be seen only by technical personnel authorized to make statistical analyses of the data.

DONORA HEALTH STUDY, MARCH 1957

Name:
Date:
Address:
(Please correct this address if it is in error)

1. What is your present occupation? ______________ (occupation) ______________ (Company, if any)

2. When did you move from Donora? ______ (Year)

3. Do you have any of the following chronic conditions or ailments even though they may not bother you all the time? (Circle the conditions you have)

a. Rheumatism and arthritis
b. Heart disease
c. Rheumatic fever
d. High blood pressure
e. Diabetes (sugar in the urine)
f. Chronic bronchitis
g. Chronic sinus trouble
h. Asthma
i. Kidney trouble
j. Hardening of the arteries
k. Hernia - rupture

4. If you circled any of the chronic conditions in question 3, have you seen a doctor about any of your conditions? Yes ☐ No ☐

(If your answer is "Yes", please fill in the information in the table)

Name of Doctor Last Seen for Each Condition Reported	Doctor's Address Street and Number	City	State	Reason for Seeing Doctor

5. Have you been in a hospital overnight or longer since October, 1948? Yes ☐ No ☐

(If your answer is yes, please fill in the information in the table)

Name and address of Hospital	Date you entered (month and year)	Reason for entering hospital

6. Did you become ill during the smog episode in October, 1948? Yes ☐ No ☐

According to our records, the following persons whom we have not yet contacted lived with you in 1948. Please indicate the present address of these persons. If any of the listed persons are dead please record the date of their death, the place of death and the cause of death.

Address of persons no longer living with you

Name of Person	Street and Number	City	State

Persons who have died since 1948

Name of Person	Date of Death	Place of Death	Cause of Death

APPENDIX D

Punch Card Codes

The data in this report have been processed by punch card methods utilizing the Department's IBM installation which includes a punch, sorter, reproducing punch, collator, and tabulator. The codes developed for this work are included in this appendix. Five separate cards were utilized.

Card 1. A single card for each person designated for inclusion in the one-third sample of the 1957 residents of the Borough.

Card 2. A single card for each of the 4095 persons included in the USPHS study in 1948-49 who resided in Donora at that time.

Card 3. A single card for each chronic disease reported by a person having a Card 2.

Card 4. A single card for each symptom reported by a person having a Card 2.

Card 5. A single card for each person included in the USPHS study in 1948-49 who died subsequent to October 28, 1948.

Card 1

DONORA HEALTH SURVEY

Individual Card - 1957 Sample

Columns	Information	Source
1	Donora Study Card Number 1 - Individual Card	General
2 - 7	Individual Number Cols. 2-5 from number in upper right hand corner Cols. 6-7 from column number in schedule	Front page and columns in schedul
8	Relationship to Household Head 1 - Head 2 - Husband or wife 3 - Son or daughter 4 - Mother or father 5 - Brother or sister 6 - Father-in-law or mother-in-law 7 - Brother-in-law or sister-in-law 8 - Other related 9 - Unrelated by blood or marriage y - No information	Question 21
9	Sex and Race 1 - White male 2 - White Female 3 - Negro male 4 - Negro female 5 - Other male 6 - Other female y - No information	Question 22-23
10 - 11	Age 00 - under 1 year 01 - one but less than two years old 02 - two but less than three years old . . . . . 99 - ninety-nine years or older yy - no information	Question 24

Columns	Information	Source
12	Marital Status 1 - Married 2 - Widowed 3 - divorced 4 - separated 5 - Unmarried y - No information	Question 25
13	1949 Sample Person? 0 - No 1 - Yes 2 - Not born y - No information	Question 29
13	Mobility - Change of Address since 1948-49 0 - Same address October 1948 and now 1 - Donora address now, different Donora address 1948 2 - Donora address now, Washington, Westmoreland or Allegheny County address in 1948 3 - " " ", Pennsylvania, West Virginia or Ohio address in 1948 4 - " " ", other U.S. address in 1948 5 - " " ", address other than one of the 48 States in 1948 6 - Washington, Westmoreland or Allegheny Co. now, Donora area 1948 7 - Pennsylvania, West Virginia or Ohio now, Donora area 1948 8 - Other U. S. now, Donora area 1948 9 - Not in one of the 48 States now, Donora area 1948 x - Not born October 1948 y - No information	Question 27

(Donora area defined to be any address in the 1948-49 sample listing)

Columns	Information	Source
15	Change of Household Since October 1948	Question 28
	0 - Same head of household as now	
	1 - Different head of household	
	2 - Not born	
	y - No information	
16	Number of Persons in Household	Question 20
	1 - Single person household	
	2 - Two person household	
	.	
	.	
	.	
	9 - Nine or more persons in household	
	y - No information	
17 - 18	Type of Family	Questions 20,21
	00 - Man (head) alone	
	01 - Man (head) with children only	
	02 - Man (head) with relatives only	
	03 - Man (head) with non-relatives(s) only	
	04 - Man (head) with children and other relatives	
	05 - Man (Head) with children and non-relatives	
	06 - Man (head) with relatives and non-relatives	
	07 - Man (head) with children, other relatives, and non-relatives	
	08 - Woman (head) alone	
	09 - Woman (head) with children only	
	10 - Woman (head) with relatives only	
	11 - Woman (head) with non-relatives only	
	12 - Woman (head) with children and other relatives	
	13 - Woman (head) with children and non-relatives	
	14 - Woman (head) with relatives and non-relatives	

15 - Woman (head) with children, other relatives, and non-relatives

16 - Man (head) with wife only

17 - Man (head) with wife and children

18 - Man (head) with wife and relatives

19 - Man (head) with wife and non-relatives

20 - Man (head) with wife and children and relatives

21 - Man (head) with wife and children and non-relatives

22 - Man (head) with wife and relatives and non-relatives

23 - Man (head) with wife and relatives, non-relatives, and children

19 Respondent Pre question 32

0 - Self

1 - Spouse

2 - Mother

3 - Father

4 - Brother

5 - Sister

6 - Other relative by blood or marriage

7 - Neighbor

8 - Relative, not member of household

9 - Other

y - No information

20 Interview Status Question 15

0 - Completed

1 - Refused, information from neighbors

2 - Illiterate or mute respondent, obtained from neighbors

3 - Mentally deficient respondent, obtained from neighbors

4 - Away during study period, obtained from neighbors

5 - Unable to locate, obtained from neighbors

6 - Refused, no information

7 - Illiterate, mute, or mental; no information

8 - Away during study period; no information

9 - Unable to locate, no information

21-22

Birthplace

Question 32

01 - Adah
02 - Allenport
03 - Belle Vernon
04 - Bradock
05 - Brownsville
06 - California
07 - Charleroi
08 - Clairton
09 - Coal Center
10 - Crucible
11 - Donora
12 - Duquesne
13 - Elco
14 - Elizabeth
15 - Elrama
16 - Fayette City
17 - Fredrick Town
18 - Glassport
19 - Grays Ldg.
20 - Greensboro
21 - Homestead
22 - Lock 4
23 - McKeesport
24 - Monessen
25 - Monongahela
26 - Milesville
27 - Millsboro
28 - Munhall
29 - Nemacolin
30 - New Eagle
31 - Newell
32 - New Geneva
33 - North Charleroi
34 - Pittsburgh
35 - Point Marion
36 - Poland Mines
37 - Rices Ldg.
38 - Roscoe
39 - Speers
40 - Vestaburg
41 - Webster
42 - West Brownsville
43 - West Elizabeth
44 - Gallatin
45 - Sunny Side
46 - Grandview
47 - Eldora
48 - Victory Hill
49 - Fallowfield Township
50 - Forward Township

51 - Other Washington Co.

52 - Other Westmoreland Co.

53 - Other Allegheny Co.

54 - Ohio Valley Towns and Allegheny Valley Towns in Pennsylvania, Steubenville to New Kensington

55 - Other Western Pennsylvania

Erie County
Crawford County
Mercer County
Venango County
Lawrence County
Butler County
Beaver County
Green County
Fayette County
Armstrong County

56 - Other Pennsylvania

57 - Ohio River Valley Towns in Ohio or West Virginia to Steubenville

58 - Other Ohio

59 - U.S. other than Pa., Ohio and Ohio River Valley Towns in West Virginia

60 - Aleutians, Puerto Rico, Hawaii, etc.

61 - Africa

62 - Australia

63 - Austria and Austria-Hungary

64 - Asia (China, Japan, Philippines, etc.)

65 - Belgium

66 - Bulgaria

67 - Canada

68 - Czechoslovakia

69 - Denmark

70 - England

71 - Finland

72 - France

73 - Germany

74 - Greece

75 - Holland
76 - Hungary
77 - Ireland
78 - Italy
79 - Latvia
80 - Lithuania
81 - New Zealand
82 - Norway
83 - Palestine
84 - Poland
85 - Rumania
86 - Russia
87 - Scotland
88 - Spain
89 - Sweden
90 - Switzerland

91 - Syria
92 - Turkey
93 - Uraguay
94 - Wales
95 - West Indies
96 - Yugoslavia
97 - Argentina
98 - Mrs. Lang - Mon Valley
99 - Mrs. Lang - Tri-State
YY - No information
XX - Other Europe

23-24 Donora Residence History Question 32

00 - less than one year
01 - one year but less than two
02 - two years but less than three
.
.
.
.
99 - ninety-nine years or more
yy - no information

25-26 Monongahela Valley Residence History Question 32

00 - less than one year
01 - one year but less than two
02 - two years but less than three
.
.
.
.

99 - ninety-nine or more years

yy - No information

For this item "Monongahela Valley" is defined to include the following cities, Boroughs, name places and localities.

Monongahela Valley

01 - Adah
02 - Allenport
03 - Belle Vernon
04 - Bradock
05 - Brownsville
06 - California
07 - Charleroi
08 - Clairton
09 - Coal Center
10 - Crucible
11 - Donora
12 - Duquesne
13 - Elco
14 - Elizabeth
15 - Elrama
16 - Fayette City
17 - Frederick Town
18 - Glassport
19 - Grays Ldg.
20 - Greensboro
21 - Homestead
22 - Lock 4
23 - McKeesport
24 - Monessen
25 - Monongahela
26 - Milesville
27 - Millsboro
28 - Munhall
29 - Nemacolin
30 - New Eagle
31 - Newell
32 - New Geneva
33 - North Charleroi
34 - Pittsburgh
35 - Point Marion
36 - Poland Mines
37 - Rices Ldg.
38 - Roscoe
39 - Speers
40 - Vestaburg
41 - Webster
42 - West Brownsville
43 - West Elizabeth
44 - Galletin
45 - Sunny Side
46 - Grandview
47 - Eldora
48 - Victory Hill
49 - Fallowfield Township
50 - Forward Township

27 Education ~~Eduction~~ Question 33

0 - less than 14 years of age

1 - less than eight grade

2 - eighth grade

3 - ninth grade

4 - tenth grade

5 - eleventh grade

6 - twelfth grade (high school)

7 - thirteen years

8 - fourteen or fifteen years

9 - sixteen or more years

y - no information

28 - 29 Present ~~October 1948~~ Occupation Question 34

00 - 18 years of age or less in 1949

01 - housewife

02 - student

03 - unemployed

04 - retired

05 - disabled

06 - no usual occupation

07 - military service

10 - professional, technical, and kindred workers

20 - farmers, farm managers, farm laborers and farm foremen

30 - managers, officials, and proprietors, except farm

40 - clerical and kindred workers

50 - craftsmen, foremen, and kindred workers

60 - operatives and kindred workers

70 - private household workers

75 - service workers, except private household

80 - laborers, except farm

yy - no information

30 - 31 Present ~~October 1949~~ Place of Work Question 34

00 - 18 years of age or less in 1948

01 - housewife at home

02 - student in school

03 --unemployed, disabled, retired, and no usual occupation at home

10 - agriculture, forestry, and fisheries

20 - mining

25 - construction, not ASW

30 - manufacturing, ASW location not specified or covers whole plant

31 - Zinc Works, ASW

32 - Steel Works, ASW (location not specified)

33 - Wire Works, ASW (location not specified)

34 - Nail Mill, ASW

35 - Open hearth, ASW

36 - Blooming Mill, ASW

37 - Blast Furnace, ASW

38 - Wire mill, ASW

39 - Rod mill, ASW

40 - Manufacturing, metal but not ASW

41 - Manufacturing, not metal

50 - Transportation, communication, and other public utilities

60 - Wholesale and retail trade

70 - Finance, insurance and real estate

80 - Business and repair services

81 - Personal services

82 - Entertainment and recreation services

83 - Professional and related services

90 - Public administration

yy - no information

32 Occupation and Industry History Question 36

0 - 18 years of age or less

1 - industrial, American Steel and Wire Co. only

2 - industrial, other than A.S.W. Co.

3 - professional

4 - commercial

5 - agricultural

6 - mining

7 - industrial, ASW Co. and other industrial

8 - industrial, ASW Co. and mining

9 - no significant work experience outside home

x - other

y - no information

(Only work experience following completion of formal education to be considered)

33 Smoking History

Question 37-38

0 - never smoked

1 - smoked, less than 2 years

2 - smoked, 3 to 5 years

3 - smoked, 6 to 8 years

4 - smoked, 9 to 11 years

5 - smoked, 12 to 14 years

6 - smoked, 15 to 17 years

7 - smoked, 18 to 20 years

8 - smoked, 21 to 23 years

9 - smoked, 24 or more years

y - no information

34 Smoking History

Question 39

0 - no cigarettes smoked

1 - 5 cigarettes or less per day

2 - 5 to 9 cigarettes per day

3 - 10 to 14 cigarettes per day

4 - 15 to 19 cigarettes per day

5 - 20 to 24 cigarettes per day

6 - 25 to 29 cigarettes per day

7 - 30 to 34 cigarettes per day

8 - 35 to 39 cigarettes per day

9 - 40 or more cigarettes per day

y - no information

35 Disablement - not due to acute illness

Question 40

0 - none

1 - A

2 - B

3 - C

4 - D

5 - E

6 - F

7 - G

8 - H

9 - more than one

y - no information

36 **Years of Disablement - not due to acute illness** Question 40

0 - not disabled

1 - one year or less

2 - one to anything less than 3 years

3 - three to anything less than 5 years

4 - five to anything less than 10 years

5 - ten to anything less than 15 years

6 - Fifteen to anything less than 20 years

7 - twenty to anything less than 25 years

8 - twenty five to anything less than 30 years

9 - more than 30 years

y - no information

37 - 39 **Reason for Disablement** Question 40

(International List) If two reasons are given for a single disablement, code the major reason.
If two or more disabilities, give reason for first one mentioned.

40 **Number of Chronic Conditions** Question 41

0 - none

1 - one

2 - two

.

.

.

9 - nine or more

y - no information

41 **First Chronic Condition** Question 41

0 - none

1 - A

2 - B

3 - C

4 - D

5 - E

6 - F

7 - G

8 - H

9 - I

x - J

y - K

42 Second Chronic Condition Question 41

0 - none
1 - A
2 - B
3 - C
4 - D
5 - E
6 - F
7 - G
8 - H
9 - I
x - J
y - K

43 Third Chronic Condition Question 41

0 - none
1 - A
2 - B
3 - C
4 - D
5 - E
6 - F
7 - G
8 - H
9 - I
x - J
y - K

44 Number of Symptoms Question 42

0 - none
1 - one
2 - two
3 - three
4 - four
5 - five
6 - six
7 - seven
8 - eight
9 - nine or more
y - no information

45 - 46 First Symptom Question 42

00 - none
01 - A
02 - B
03 - C
04 - D
05 - E
06 - F
07 - G
08 - H
09 - I
10 - J
11 - K
12 - L
13 - M
14 - N
15 - O
16 - P
17 - Q
18 - R
19 - S
20 - T
21 - U

47 - 48 **Second Symptom** Question 42

00 - none
01 - A
02 - B
03 - C
04 - D
05 - E
06 - F
07 - G

08 - H
09 - I
10 - J
11 - K
12 - L
13 - M
14 - N

15 - O
16 - P
17 - Q
18 - R
19 - S
20 - T
21 - U

49 - 50 **Third Symptom** Question 43

00 - none
01 - A
02 - B
03 - C
04 - D
05 - E
06 - F

07 - G
08 - H
09 - I
10 - J
11 - K
12 - L
13 - M

14 - N
15 - O
16 - P
17 - Q
18 - R
19 - S
20 - T

21 - U

51. age Groups (1957 age)

0 - 0-4
1 - 5-14
2 - 15-24
3 - 25-34
4 - 35-44

5 - 45-54
6 55-64
7 65-74
8 75+
9 - Unknown

Card 2

DONORA HEALTH STUDY

[illegible]

1948 Sample Person Card

Column	Information	Source
1	Card Number 2 - 1948 Sample person	General
2 - 7	Individual Number Cols. 2-5 from number in upper right hand corner Cols. 6-7 from column number in schedule	Front page and columns in schedule

NOTE: For 1948 persons now dead assign the household number corresponding to (1) the household from which the death occurred or (2) the household from which the information was obtained. Code the individual number 20, 21, 22, etc. for one, two, three, etc., deaths from same household.

For 1948 sample persons no longer residing in Donora new household and individual numbers will be assigned as the schedules are edited. Household numbers will begin with 4000 and proceed serially. Deaths again are to be handled as above using the series 20 to 29 in column 6 and 7 as required.

At the end of the field work some 1948 sample persons will remain about whom we will have no information. Card 2 will be coded and punched for such persons using the 5000 series for the household number and the 30 series for individual numbers.

Household Numbers	**Description**
0001 - 3235	Census, 57 Sample, and 48 Sample.
3500 -	Refused and Incomplete
3999 -	Irondale Hotel, and Community Center
4000 -	Personal interviews, out of town
5000 -	Mailed replies; Individual nos. are 30's.
6000 -	Deceased or institutionalized
6500 -	Deceased since Smog and before 1948 Interview
8000 -	No replies: Complete new address Partial new address New address, Donora and vicinity Military service Institution Address unknown

8 **Relationsip to Household Head** Question 21

1 - Head
2 - Husband or wife
3 - Son or daughter
4 - Mother or father
5 - Brother or sister
6 - Father-in-law or mother-in-law
7 - Brother-in-law sister-in-law
8 - Other related
9 - Unrelated by blood or marriage
y - No information

9 **Sex and Race** Question 22-23

1 - White male
2 - White Female
3 - Negro male
4 - Negro female
5 - Other male
6 - Other female
y - no information

10 - 11 **Age** Question 24

00 - under 1 year
01 - one but less than two years old
02 - two but less than three years old
.
.
.
.
99 - ninety-nine years or older
yy - no information

12 **Marital Status** Question 25

1 - married
2 - widowed
3 - divorced
4 - separated
5 - unmarried
y - no information

13 **1957 Sample Person** Question 29

0 - No
1 - Yes
y - No information

14 **Mobility - Change of address since October 1948** Question 27

0 - Same address October 1948 and now

1 - Donora address now, different Donora address 1948

2 - " " , Washington, Westmoreland or Allegheny County address in 1948

3 - " " , Pennsylvania, West Virginia or Ohio address in 1948

4 - " " , Other U. S. address in 1948

5 - " " , address other than one of the 48 States in 1948

6 - Washington, Westmoreland or Allegheny Co. now, Donora area 1948

7 - Pennsylvania, West Virginia or Ohio now, Donora area 1948

8 - Other U. S. now, Donora area 1948

9 - Not in one of the 48 States now, Donora area 1948

x - Not born October, 1948

y - No information

(Donora area defined to be any address in the 1948-49 sample listing)

15 **Change of Household since October, 1948** Question 28

0 - Same head of household as now

1 - Different head of household

y - No information

16 **Number of Persons in 1957 Household** Question 20

1 - Single person household

2 - Two person household

.

.

.

9 - Nine or more persons in household

y - No information

17 - 18 **Type of 1957 Family** Question 20-21

00 - Man (head) alone

01 - Man (head) with children only

02 - Man (head) with relatives only

03 - Man (head) with non-relatives(s) only

04 - Man (head) with children and other relatives

05 - Man (head) with children and non-relatives

06 - Man (head) with relatives and non-relatives

07 - Man (head) with children, other relatives, and non-relatives

08 - Woman (head) alone

09 - Woman (head) with children only

10 - Woman (head) with relatives only

11 - Woman (head) with non-relatives only

12 - Woman (head) with children and other relatives

13 - Woman (head) with children and non-relatives

14 - Woman (head) with relatives and non-relatives

15 - Woman (head) with children, other relatives, and non-relatives

16 - Man (head) with wife only

17 - Man (head) with wife and children

18 - Man (head) with wife and relatives

19 - Man (head) with wife and non-relatives

20 - Man (head) with wife and children and relatives

21 - Man (head) with wife and children and non-relatives

22 - Man (head) with wife and relatives and non-relatives

23 - Man (head) with wife and relatives, non-relatives, and children

8000 Series (8 in Col. 2)

Code for Column 20

0 - Completely unknown

1 - Insufficient address - alive

2 - Donora and vicinity, new address

3 - Not Donora and vicinity, new address

4 - Military address, new address

5 - Institutions

6 - College

7 - Others

8 - Individual card missing

19 **Respondent** Pre Question 32

0 - Self
1 - spouse
2 - mother
3 - father
4 - brother
5 - sister
6 - other relative by blood or marriage
7 - neighbor
8 - relative not member of household
9 - other
y - no information

20 **Interview Status** Question 15 and notes on schedule

0 - Completed
1 - Refused, information from neighbors
2 - Illiterate or mute respondent, obtained from neighbors
3 - Mentally deficient respondent, obtained from neighbors
4 - Away during study period, obtained from neighbors
5 - Unable to locate, obtained from neighbors
6 - Refused, no information
7 - Illiterate, mute, or mental; no information
8 - Away during study period; no information
9 - Unable to locate, no information

21 - 22 **Birthplace** Question 32

01 - Adah
02 - Allenport
03 - Belle Vernon
04 - Bradock
05 - Brownsville
06 - California
07 - Charleroi
08 - Clairton
09 - Coal Center
10 - Crucible
26 - Milesville
27 - Millsboro
28 - Munhall
29 - Nemacolin
30 - New Eagle
31 - Newell
32 - New Geneva
33 - North Charleroi
34 - Pittsburgh
35 - Point Marion

11 - Donora

12 - Duquesne

13 - Elco

14 - Elizabeth

15 - Elrama

16 - Fayette City

17 - Fredrick Town

18 - Glassport

19 - Grays Ldg.

20 - Greensboro

21 - Homestead

22 - Lock 4

23 - McKeesport

24 - Monessen

25 - Monongahela

36 - Poland Mines

37 - Rices Ldg.

38 - Roscoe

39 - Speers

40 - Vestaburg

41 - Webster

42 - West Brownsville

43 - West Elizabeth

44 - Galatin

45 - Sunny Side

46 - Grandview

47 - Eldora

48 - Victory Hill

49 - Fallowfield

50 - Forward Township

51 - Other Washington Co.

52 - Other Westmoreland Co.

53 - Other Allegheny Co.

54 - Ohio Valley Towns and Allegheny Valley Towns in Pennsylvania, Steubenville to New Kensington

55 - Other Western Pennsylvania

  Erie County
  Crawford County
  Mercer County
  Venango County
  Lawrence County
  Butler County
  Beaver County
  Armstrong County
  Green County
  Fayette County

56 - Other Pennsylvania

57 - Ohio River Valley Towns in Ohio or West Virginia to Steubenville

58 - Other Ohio

59 - U.S. other than Pa., Ohio and Ohio River Valley Towns in West Virginia

60 - Aleutians, Puerto Rico, Hawaii, etc.

61 - Africa

62 - Australia

63 - Austria and Austria-Hungary

64 - Asia (China, Japan, Philippines etc.)

65 - Belgium

66 - Bulgaria

67 - Canada

68 - Czechoslovakia

69 - Denmark

70 - England

71 - Finland

72 - France

73 - Germany

74 - Greece

75 - Holland

76 - Hungary

77 - Ireland

78 - Italy

79 - Latvia

80 - Lithuania

81 - New Zealand

82 - Norway

83 - Palestine

84 - Poland

85 - Rumania

86 - Russia

87 - Scotland

88 - Spain

89 - Sweden

90 - Switzerland

91 - Syria

92 - Turkey

93 - Uraguay

94 - Wales

95 - West Indies

96 - Yugoslavia

97 - Argentina

98 - Mrs. Lang - Mon Valley

99 - Mrs. Lang - Tri-State

YY - No information

23 - 24 Donora Residence History Question 32

00 - less than one year

01 - one year but less than two

02 - two years but less than three

.
.
.
.

99 - ninety-nine years or more
yy - No information

25 - 26 Monongahela Valley Residence History Question 32

00 - less than one year

01 - one year but less than two

02 - two years but less than three

.
.
.
.

99 - ninety-nine or more years
yy - No information

For this item "Monongahela Valley" is defined to include the following cities, Boroughs, name places and localities.

01 - Adah
02 - Allenport
03 - Belle Vernon
04 - Bradock
05 - Brownsville
06 - California
07 - Charleroi
08 - Clairton
09 - Coal Center
10 - Crucible
11 - Donora
12 - Duquesne
13 - Elco
14 - Elizabeth
15 - Elrama
16 - Fayette City
17 - Frederick Town
18 - Glassport
19 - Grays Ldg.
20 - Greensboro
21 - Homestead
22 - Lock 4
23 - McKeesport
24 - Monessen
25 - Monongahela
26 - Milesville
27 - Millsboro
28 - Munhall
29 - Nemacolin
30 - New Eagle
31 - Newell
32 - New Geneva
33 - North Charleroi
34 - Pittsburgh
35 - Point Marion
36 - Polan Mines
37 - Rices Ldg.
38 - Roscoe
39 - Speers
40 - Vestaburg
41 - Webster
42 - West Brownsville
43 - West Elizabeth
44 - Gallatin
45 - Sunny Side
46 - Grandview
47 - Eldora
48 - Victory Hill
49 - Fallowfield
50 - Forward Township

27 **Education** Question 33

0 - less than 14 years of age

1 - less than eighth grade

2 - eighth grade

3 - ninth grade

4 - tenth grade

5 - eleventh grade

6 - twelfth grade (high school)

7 - thirteen years

8 - fourteen or fifteen years

9 - sixteen or more years

y - no information

28 - 29 **Occupation** Question 34

00 - 18 years of age or less

01 - housewife

02 - student

03 - unemployed

04 - retired

05 - disabled

06 - no usual occupation

07 - military service

10 - professional, technical, and kindred workers

20 - farmers, farm managers, farm laborers and farm foremen

30 - managers, officials, and proprietors, except farm

40 - clerical and kindred workers

50 - craftsmen, foreman and kindred workers

60 - operatives and kindred workers

70 - private household workers

75 - service workers, except private household

80 - laborers, except farm

yy - no information

30 - 31 **Place of Work** Question 35

00 - 18 years of age or less

01 - housewife at home

02 - student in school

03 - unemployed, disabled, retired, and no usual occupation at home

10 - agriculture, forestry and fisheries

20 - mining

25 - construction, not ASW

30 - Manufacturing, ASW location not specified or covers whole plant

31 - Zinc Works, ASW

32 - Steel Works, ASW (location not specified)

33 - Wire Works, ASW (location not specified)

34 - Nail Mill, ASW

35 - Open Hearth, ASW

36 - Blooming Mill, ASW

37 - Blast Furnace, ASW

38 - Wire Mill, ASW

39 - Rod Mill, ASW

40 - Manufacturing - Metal but not ASW

41 - Manufacturing - not metal

50 - Transportation, communication, and other public utilities

60 - Wholesale and retail trade

70 - Finance, insurance and real estate

80 - Business and repair services

81 - Personal services

82 - Entertainment and recreation services

83 - Professional and related services

90 - Public Administration

yy - No information

32 Occupation and Industry History Question 36

0 - 18 years of age or less

1 - industrial, American Steel and Wire Co. only

2 - industrial, other than ASW Co.

3 - professional

4 - commercial

5 - agricultural

6 - mining

7 - industrial, ASW Co. and other industrial

8 - industrial, ASW Co. and mining

9 - no significant work experience outside home

x - other

y - no information

(Only work experience following completion of formal education to be considered)

33 Smoking History Question 37-38

0 - never smoked

1 - smoked, less than 2 years

2 - smoked, 3 to 5 years

3 - smoked, 6 to 8 years

4 - smoked, 9 to 11 years

5 - smoked, 12 to 14 years

6 - smoked, 15 to 17 years

7 - smoked, 18 to 20 years

8 - smoked, 21 to 23 years

9 - smoked, 24 or more years

y - no information

34 Smoking History Question 39

0 - no cigarettes smoked

1 - 5 cigarettes or less per day

2 - 5 to 9 cigarettes per day

3 - 10 to 14 cigarettes per day

4 - 15 to 19 cigarettes per day

5 - 20 to 24 cigarettes per day

6 - 25 to 29 cigarettes per day

7 - 30 to 34 cigarettes per day

8 - 35 to 39 cigarettes per day

9 - 40 or more cigarettes per day

35 Disablement - not due to acute illness Question 40

0 - none

1 - A

2 - B

3 - C

4 - D

5 - E

6 - F

7 - G

8 - H

9 - more than one

y - no information

36 Years of Disablement - not due to acute illness — Question 40

0 - not disabled

1 - one year or less

2 - one to anything less than three years

3 - three to anything less than five years

4 - five to anything less than ten years

5 - ten to anything less than 15 years

6 - fifteen to anything less than 20 years

7 - twenty to anything less than 25 years

8 - twenty-five to anything less than 30 years

9 - more than 30 years

y - No information

37 - 39 Reason for Disablement — Question 40

(International List) If two reasons are given for a single disablement code the major reason.

If two or more disabilities, give reason for first one mentioned.

40 Number of Chronic Conditions — Question 41

0 - none

1 - one

.

.

.

9 - nine or more

y - no information

41 Number of Symptoms — Question 42

0 - none

1 - one

.

.

9 - nine or more

y - no information

42 Under a Doctor's Care Now — Question 43

0 - No

1 - Yes

y - No information

43 Medical Attention Since 1948 Question 44-45

0 - Have not seen a doctor since 1948 about listed conditions

1 - Have seen a doctor since 1948, acute only

2 - Have seen a doctor since 1948, chronic only

3 - Have seen a doctor since 1948, acute and chronic

y - no information

44 Hospitalization since 1948 Question 46

0 - not hospitalized

1 - hospitalized once

2 - hospitalized twice

3 - hospitalized three times

.

.

.

9 - hospitalized nine or more times

y - no information

45 Smog Illness - 1948 Question 47

0 - did not become ill

1 - became ill

y - no information

46 - 47 Interviewer

01 - Balas
02 - Brisbane
03 - Carter
04 - Golosimo
05 - Forlini
06 - Furnier
07 - Hartman
08 - Kopac
09 - Lang
10 - Mehan
11 - Mouyard
12 - Ricci
13 - Roman
14 - Rusv
15 - Schall
16 - Sinclair
17 - Smith
18 - Trubell
19 - other interviewer Wieland
20 - mailed questionnaire
21 - other source
yy - no information

48 Medical Authorization Information — Face of Schedule

0 - none required

1 - Doctor or doctors required and obtained

2 - " " " not obtained

3 - Hospital required and obtained

4 - " " " not obtained

5 - Doctor and hospital required and obtained

6 - " " " neither obtained

7 - " " " only hospital obtained

8 - " " " only doctor obtained

9 - Blue Cross, Blue Shield, etc. available

y - no information

49 - 50 October 1948 Occupation — USPHS - Schedule

00 - 18 years of age or less in 1949

01 - housewife

02 - student

03 - unemployed

04 - retired

05 - disabled

06 - no usual occupation

10 - professional, technical, and kindred workers

20 - farmers, farm managers, farm laborers and farm foremen

30 - managers, officials, and proprietors, except farm

40 - clerical and kindred workers

50 - craftsmen, foremen, and kindred workers

60 - operatives and kindred workers

70 - private household workers

75 - service workers, except private household

80 - laborers, except farm
yy - No information

51 - 52 **October 1949 Place of Work** **USPHS - Schedule**

00 - 18 years of age or less in 1948

01 - housewife at home

02 - student in school

03 - unemployed, disabled, retired, and no usual occupation at home

10 - agriculture, forestry, and fisheries

20 - mining

25 - construction, not ASW

30 - manufacturing, ASW location not specified or covers whole plant

31 - Zinc Works, ASW

32 - Steel Works, ASW (location not specified)

33 - Wire Works, ASW (location not specified)

34 - Nail Mill, ASW

35 - Open hearth, ASW

36 - Blooming Mill, ASW

37 - Blast Furnace, ASW

38 - Wire mill, ASW

39 - Rod mill, ASW

40 - Manufacturing, metal but not ASW

41 - Manufacturing, not metal

50 - Transportation, communication, and other public utilities

60 - Wholesale and retail trade

70 - Finance, insurance and real estate

80 - Business and repair services

81 - Personal services

82 - Entertainment and recreation services

83 - Professional and related services

90 - Public administration

yy - No information

53 **Occupation and Industry History - Prior to 1949** USPHS - Schedule

0 - 18 years of age or less in 1948

1 - industrial, American Steel and Wire Co. only

2 - industrial, other than ASW Co.

3 - professional

4 - commercial

5 - agricultural

6 - mining

7 - industrial, ASW Co. and other industrial

8 - industrial, ASW Co. and mining

9 - No significant work experience outside home

x - other

y - no information

(Only work experience following completion of formal education to be considered)

54 **1948 Residence** USPHS Schedule and Borough Map

0 - Donora, North of 10th Street

1 - Donora, between 4th and 10th St. and between the Monongahela and Thompson Ave.

2 - Donora, Between 4th and 10th St. and between Thompson and Carroll Twp.

3 - Donora, South of 4th St. between Monongahela and Thompson Ave.

4 - Donora, South of 4th St. between Thompson Ave. and Carroll Twp.

5 - Webster

6 - Webster Hollow

7 - Wilco Hill, Fellsburgh and other Westmoreland

8 - Grandview

9 - Other Carroll Twp.

y - no information

55 October 1948 Smog affection USPHS Schedule

0 - Not affected

1 - Affected, mild

2 - Affected, moderate

3 - Affected, severe

y - no information

(NOTE: The classification scheme for severity is as follows:)
mild symptom - smarting of eyes, lacrimation, nasal discharge, choking (that is a sense of constriction of the throat), sore throat, nonproductive cough, nausea without vomiting, headache, weakness, and aches and pains.
moderate symptoms - productive cough, constriction of chest (defined as a sense of tightness or feeling of pressure in chest) dyspnoea without orthopnea, vomiting and diarrhea.

severe symptoms - orthopnea

No. and kind of symptoms	Additional Factors for Classifying Severity		
	No period of disability; No medical care; No symptoms still present at time of survey	Disability 1-3 days and/or medical care and/or symptoms still present at time of survey	Disability of 4 days or longer
1 to 3 mild symptoms	mild	moderate	moderate
4 or more mild symptoms	moderate	moderate	severe
1 to 3 moderate symptoms with or without mild symptoms	moderate	moderate	severe
4 or more moderate symptoms with or without mild symptoms	moderate	severe	severe
orthopnea	moderate	severe	severe

Medical care is defined as seeing a Dr. or entering a hospital or receiving treatment.

56 Asthma USPHS Schedule

0 - No

1 - Yes

y - no information

57 **Heart Disease** USPHS Schedule

0 - No

1 - Yes

y - No information

58 **Chronic Bronchitis** USPHS Schedule

0 - No

1 - Yes

y - No information

59 **Tuberculosis, Sinusitis, Rundown** USPHS Schedule

0 - No

1 - Yes

y - No information

60 **Pneumonia** USPHS Schedule

0 - No

1 - Yes

y - No information

61 - 62 **Age as of 1948** USPHS Schedule

00 - 99

yy - Unknown

63 - 64 **Age groups as of 1948** USPHS Schedule

01 - 6

02 - 6-12

03 - 13-19

04 - 20-24

05 - 25-29

06 - 30-34

07 - 35-39

08 - 40-44

09 - 45-49

10 - 50-54

11 - 55-59

12 - 60-64

13 - 65+

14 - Unknown

65 Heart Disease in 1957

Card 3 - 02 in cols.
9-10 of matching card

0 - No

1 - Yes

66 Asthma in 1957

Card 3 - 08 in cols.
9-10 of matching card

0 - No

1 - Yes

67 Chronic Bronchitis in 1957

Card 3 - 06 in cols.
9-10 of matching card

0 - No

1 - Yes

68 Chronic Sinus in 1957

Card 3 - 07 in cols.
9-10 of matching card

0 - No

1 - Yes

69 Interview Status (Revised - Summary of Cols. 2, 6 and 20)

	Definition	Description
1.	"2" Col. 6	Deceased
2.	0-4 Col. 2 and 0 Col. 20	Pers. Interview Completed
3.	5-6 Col. 2 and 0 Col. 20	Mailed Questionnaire Completed
4.	0-4 Col. 2 and 1 Col. 20	Refusal - Information from Neighbors
5.	0-4 Col. 2 and 2-5 Col. 20	Interview Completed - other
6.	0-4 or 6 Col. 2 and 6-9 Col. 20	Incomplete: Refusals, etc.
7.	8 Col. 2 and 2 Col. 20	Incomplete: (New Address) Donora and Vicinity
8.	8 Col. 2 and 3-6 Col. 20	Incomplete: (New Address) Moved from Donora
9.	8 Col. 2 and 1 Col. 20	Incomplete: (Inadequate Address) Moved from Donora
Y.	8 Col. 2 and 0 Col. 20 Or 0-4 Col. 2 and 0 Col. 20	Incomplete: Unknown

71 High blood pressure

Card 3, 04 in Cols. 9, 10 of matching card

0 - No

1 - Yes

X overpunch = "1" in one or more of the following cols. 65, 66, 67, 68, 71, 72, or 73 -- Chronic Disease in 1957

72 Hardening of the arteries

Card 3 - 10 in Cols. 9-10 of matching card

0 - No

1 - Yes

X overpunch = Has seen a Dr. for one or more of the following chronic diseases; heart disease, high blood pressure, hardening of the arteries, asthma, bronchitis, sinus or kidney trouble.

73 Kidney trouble

Card 3 - 09 in Cols. 9-10 of matching card

0 - No

1 - Yes

X overpunch = Has been hospitalized for one or more of the following chronic diseases: heart disease, high blood pressure, hardening of the arteries, sinus trouble, asthma, bronchitis, or kidney trouble.

74 Rheumatism or Arthritis

Card 3 - 01 in Cols. 9-10 of matching card

0 - No

1 - Yes

75 Illness Status

1 - Not ill (0's in all of the following Cols. 35, 40, 41, 42, 56, 57, and 58, that is, no disablements, chronic diseases, or symptoms, not under a doctor's care and no asthma, bronchitis or heart disease in 1948

2 - Equivical Only health conditions mentioned are symptoms alone or medical attention since 1948 for chronic conditions alone or 1948 chronic conditions since cleared up alone or hospitalizations for other than routine pregnancies alone or combinations of these

3 - Ill Disabled, chronic conditions, under a doctor's care now or dead - 2 in Col. 6 or 1-9 in at least one of the following Cols. - 35, 40, 42.

76 1957 Age Groupings used in Butler Study

0 - 0-4
1 - 5-14
2 - 15-24
3 - 25-34
4 - 35-44
5 - 45-54
6 - 55-64
7 - 65-74
8 - 75 and over
9 - Age unknown

Card 3

DONORA HEALTH STUDY

Chronic Disease Card

Column	Information	Source
1	3 - Chronic Disease Card Code and punch a card for each different chronic disease mentioned in answer to question 41 and sequelae for 1948 sample persons.	General
2-7	Individual Number 2-5 - household number 6-7 - individual number (see card 2 code for special identification of dead and moved persons)	Face of schedule and column number inside schedule
8	First Source of Information 1 - completed interview questionnaire with individual 2 - completed interview questionnaire with substitute respondent in family or hh 3 - death certificate 4 - mailed questionnaire 5 - medical record 6 - neighbors 7 - 8 - 9 - y - no information	Face of schedule
9-10	Chronic Disease 01 - Rheumatism and arthritis (a) 02 - Heart Disease (b) 03 - Rheumatic fever (c) 04 - High blood pressure (d) 05 - Diabetes (e)	Question 42 and later death certificate, mailed questionnaire, and flash card

06 - Chronic bronchitis (f)

07 - Chronic sinus trouble (g)

08 - Asthma (h)

09 - Kidney trouble (i)

10 - Hardening of the arteries (j)

11 - Hernia - rupture (k)

yy - No information

11 **Medical Attention since 1948**

Question 43,44,45, 46 and Table 1 and 2

0 - Has not seen a doctor since onset of this condition

1 - Has seen a doctor since onset of this condition but not because of this condition

2 - Has seen a doctor specifically for this condition

y - No information

12 **Hospitalization since 1948**

Question 46 and Table 2

0 - Has not been hospitalized for this condition

1 - Has been hospitalized for or on account of this condition

2 - Has been hospitalized but not for this condition

y - No information

13-14 **Doctor last seen about Condition**

Table 1 (e)

00 - None
01 - Berlin
02 - Brown
03 - Chalfant
04 - Furlong
05 - Hannigan
06 - Heater
07 - Koehler
08 - Levin
09 - Novotny
10 - Walter Rongaus
11 - William Rongaus
12 - Roth
13 - Soffel
14 - Forest
15 - Coasier
16 - Sickman
17 - Golomb
18 - Blyth
19 - King
20 - Gimmell
21 - Perone
22 - Rolland
23 - Hofstetter
24 - Hughes
25 - Buchanan
26 - Fetter
27 - Doering
28 - R. Hamilton
29 - Steele
30 - Charles
31 - Cotton
32 - Gadd

33 - Lindy
34 - Carlin
35 - Clarkson
36 - Linhert
37 - Beat
38 - Johnson
39 - Rosenbloom
40 - Thrope
41 - Bartlett
42 - Braveman
43 - Bailey
44 - Strang
45 - Murphy
46 - Fingold
47 - O'Leary

48 - McCormick
49 - Waxman
50 - Eisenbies
51 - Costa
52 - Margolis
53 - Fisher
54 - Bileky, 15th St.,NYC 3
55 - Thrope
56 - Campana
57 - Pangborn
58 - Meyers
59 - Dale
60 - Vaccaro
61 - Baker
62 - Dexter
63 - Foster
64 - Bradshaw
65 - Skurkey
66 - Dow
67 - Oehrle
68 - Stevenson*
69 - Silverman
70 - Blasiole
71 - Kuhns
72 - Freedman
73 - Norton
74 - Zorhorst
75 - Stevenson*
76 - Post
77 - Barberio
78 - Downy
79 - Stern
80 - Kreger
81 - McClelland
82 - Hiberling
83 - Utley
84 - Hughes
85 - Kartub
86 - Shurkey
87 - Dorrance
88 - Levindorf
89 - Schwartz
90 - Safier
91 - Rod
92 - Denberg
93 - Mullens
94 - Goldblum
95 -

96 - All other out of town doctors
97 - Nokes-Charlotteville, Va.
98 - All Service Drs.
99 - Lester
* - Same doctor

(Add names and addresses as encountered)

15 Year doctor last seen for condition — Table 1 (d)

0 - None seen

1 - 1951
2 - 1952
3 - 1953
4 - 1954
5 - 1955
6 - 1956
7 - 1957
8 - 1949
9 - 1950
x - 1948 or earlier
y - no information

16 Onset of Condition — Table 1 (g)

0 - 1950

1 - 1951
2 - 1952
3 - 1953
4 - 1954
5 - 1955
6 - 1956
7 - 1957
8 - 1948 or earlier
9 - 1949
y - no information

17 Days disabled in past year due to condition — Table 1 (h)

0 - None

1 - 1 to 4 days

2 - 5 to 9 days

3 - 10 to 14 days

4 - 15 to 30 days

5 - 30 to 60 days

6 - 60 to 90 days

7 - 3 to 6 months

8 - 6 to 9 months

9 - 9 to 12 months

y - no information

18 Frequency of Doctor visits for condition — Table 1 (i)

1 - Frequently

2 - Occasionally

3 - Rarely

y - no information

19 Medicine or treatment for condition — Table 1 (j)

1 - Regularly

2 - Not at all

2 - Occasionally

y - No information

20 Lost time from work due to condition — Table 1 (k)

0 - No lost time

1 - Time lost, one day or more

y - No information

21 Insurance or benefit claim filed — Table 1 (k)

0 - No claim filed

1 - Blue Cross

2 - Blue Shield

3 - Blue Cross and Blue Shield

4 - BARE

5 - Mutual Benefit

6 - Blue Cross, Blue Shield and BARE

7 - Franklin

8 - Metropolitan

9 - All Others

y - no information

22-23 **Hospitals**

00 - None

01 - Charleroi-Monessen

02 - Monongahela Memorial

03 - West Penn

04 - Gemmill

05 - Presbyterian

06 - Woman's

07 - Children's

08 - Eye and Ear

09 - Montefiore

10 - Magee

11 - Pittsburgh

12 - St. Francis

13 - Allegheny General

14 - Aspinwall

15 - Oakland VA

16 - Columbia

17 - Shadyside

18 - St. Margarets

19 - Mercy

20 - St. Josephs

21 - St. Johns

22 - Southside

23 - St. Clair

24 - Passavant

25 - Homestead

26 - McKeesport

27 - Western Psychiatric

28 - Cleveland Clinic

29 - Poly Clinic - Harrisburg

30 - Devine Province

31 - TB League

32 - Deshon

33 - Cresent

34 - Beth Israel

90 - Service Hospital

91 - University Hospital, Charlottesville, Va.

99 - Other

24 **Sex and Race** — Transferred from Card 2

1 - White male

2 - White female

3 - Negro male

4 - Negro female

5 - Other male

6 - Other female

y - No information

25 - 26 **Age as of 1957** — Transferred from Card 2

Age in years

yy - No information

27 **Smog Affection** — Transferred from Card 2

0 - Not affected

1 - Affected, mild

2 - Affected, moderate

3 - Affected, severe

y - No information

28 - 29 **Age as of 1948** — Transferred from Card 2

Age in years

yy - no information

30 - 31 **Age Group - 1948** — **Transferred from Card 2**

01 - 6

02 - 6-12

03 - 13-19

04 - 20-24

05 - 25-29

06 - 30-34

07 - 35-39

08 - 40-44

09 - 45-49

10 - 50-54

11 - 55-59

12 - 60-64

13 - 65+

14 - Unknown

32 **Revised Interview Status** — Transferred from Card 2

1 - Deceased

2 - Personal Interview Completed

3 - Mailed questionnaire completed

4 - Refusal - information from neighbors

5 - Interview completed - Other

6 - Incomple - Refusals

7 - Incomplete: New Address Donora and vicinity

8 - Incomplete: New Address Moved from Donora

9 - Incomplete: (Inadequate add.) Moved from Donora

Y - Incomplete - Unknown

33 **1957 Age Groups**

0 - 0-4

1 - 5-14

2 - 15-24

3 - 25-34

4 - 35-44

5 - 45-54

6 - 55-64

7 - 65-74

8 - 75+

9 - Unknown

Card 4

DONORA HEALTH STUDY

Symptoms and Conditions Card

Column	Information	Source
1	4 - Symptoms and Conditions Card Code and punch a card for each different symptom mentioned in answer to question 42 and sequalae.	General
2-7	Individual Number 2-5 household number 6-7 individual number (see card 2 code for special identification of dead and moved persons)	Face of schedule and column number inside schedule
8	Source of Information 1 - completed interview questionnaire with individual 2 - completed interview questionnaire with substitute respondent 3 - neighbors 4 - no information	Face of schedule
9-10	Symptom 01 - High blood pressure 02 - Low blood pressure 03 - Pain over heart 04 - Thumping heart 05 - Any other heart trouble 06 - Short of breath easily 07 - Short of breath lying down 08 - Swollen ankles at night 09 - Blacking out 10 - Spots before the eyes	

11 - Dizzy spells

12 - Frequent sore throats

13 - Hoarse for a long time

14 - Nose continually stuffed up

15 - Constantly running nose

16 - Continuous severe colds

17 - Heavy chest colds

18 - Severe pains in the chest

19 - Severe soaking seats at night

20 - Chronic chest condition

21 - Eye irritation

yy - No information

11 Medical Attention Since 1948 Question 43,44,45, 46, and Table 1 and 2

0 - Has not seen a doctor since onset of this condition

1 - Has seen a doctor since onset of this condition but not because of this condition

2 - Has seen a doctor specifically for this condition

y - No information

12-13 Doctor last seen about condition Table 1 ( )

SEE 13-14 in CARD 3

Card 5

DONORA HEALTH STUDY
MORTALITY CARD

Column	Information	Source
1	**Card Number** 5 - Mortality Card	General
2 - 7	**Individual Number** See Card 2 for code details	Front page and columns in schedule
8	**Sex and Race** 1 - White male 2 - White female 3 - Negro male 4 - Negro female 5 - Other male 6 - Other female y - No information	U.S.P.H.S. Schedule
9 - 10	**1948 Age** 00 - Under 1 year 01 - One but less than two years old . . . 99 - Ninety-nine years or older yy - No information	U.S.P.H.S. Schedule
11	**1948 Interview Status** 0 - Interviewed 1 - Died between Nov. 1, 1948 and time of scheduled interviewed in 1948-49 2 - Died during smog episode	USPHS Schedule and 5 x 8 file card
12	**Death Certificate** 0 - Not obtained 1 - Obtained from Harrisburg 2 - Obtained from Donora 3 - Obtained in 1948	General
13	**Year of Death** 8 - 1949 9 - 1949 0 - 1950 . . . 6 - 1956 7 - 1957	Death certificate and 5 x 8 file card

14 - 15 Month of Death — Death certificate and 5 x 8 file card

01 - January
02 - February
03 - March
04 - April
05 - May
06 - June
07 - July
08 - August
09 - September
10 - October
11 - November
12 - December

16 Place of Death — Death certificate and 5 x 8 file card

1 - Donora
2 - Charleroi-Monessen Hospital
3 - Monongahela Hospital
4 - Other Pennsylvania
5 - Out of State
y - Unknown

17 - 20 Cause of Death - Death certificate — Death certificate

4 digit cause of death code
YYYY - No death certificate

21 - 24 Cause of death - Interview report — Schedule and 5 x 8 file card

4 digit cause of death code
yyyy - Unknown cause

25 Smog affection — U.S.P.H.S. Schedule

0 - Not affected
1 - Mildly affected
2 - Moderately affected
3 - Severely affected
y - Unknown

26 Age groups (1948)

1 - <6
2 - 6 - 19
3 - 20 - 34
4 - 35 - 49
5 - 50 - 64
6 - 65+

27 Date of Death - Summarized (Cols. 13-15)

1 - 10/48 - 10/49
2 - 11/49 - 10/50
3 - 11/50 - 10/51
4 - 11/51 - 10/52
5 - 11/52 - 10/53
6 - 11/53 - 10/54
7 - 11/54 - 10/55
8 - 11/55 - 10/56
9 - 11/56 - 4/57

28 **Cause of death broad groupings** Cols. 17-19

1 - Infective and Parasitic 001-138
2 - Neoplasma 140-239
3 - Vascular lesions affecting the Central Nervous System 330-334, 780-781
4 - Diseases of the Circulatory System 400-468, 782
5 - Diseases of the Respiratory System 470-527, 241, 783
6 - All others
7 - Unknown

29 **Asthma in 1948**

1 - Yes
0 - No

30 **Heart Disease in 1948**

1 - Yes
0 - No

31 **Bronchitis in 1948**

1 - Yes
0 - No

2 - 33 **1948 Age group**

01 - 06
02 - 6-12
03 - 13-19
04 - 20-24
05 - 25-29
06 - 30-34
07 - 35-39
08 - 40-44
09 - 45-49
10 - 50-54
11 - 55-59
12 - 60-64
13 - 65+

34 **Broad Age groups - 1948**

1 - 20
2 - 20-34
3 - 35-49
4 - 50-64
5 - 65+

35 - 36 **Cause of death groups** - Cols. 17-19

01 - General arteriosclerosis 450

Heart Disease
02 - Arterosclerotic 420
03 - Chronic Rheumatic 410-416
04 - Degenative nonrheumatic 421-422
05 - With hypertension 440-443
06 - Other Heart disease 430-434
07 - Hypertension without h.d. 444-447
08 - Nephitis, acute and chronic 590-594
09 - Vascular lesions, CNS 330-334
10 - Other cardiovascular 780-782, 400-402, 451-468
11 - External Causes 800-985

Other Selected Causes

12 - Cirrhosis of liver	581
13 - Diabetes Mellitus	260
14 - Neoplasms, malignant	140-205
15 - Pneumonia, influenza	480-493
16 - Tuberculosis	001-019
17 - Bronchitis	500-502
18 - All other causes	(residual)
yy - Cause unknown	

Card 5

DONORA HEALTH STUDY
MORTALITY CARD

Column	Information	Source
1	**Card Number**	General
	5 - Mortality Card	
2 - 7	**Individual Number**	Front page and columns in schedule
	See Card 2 for code details	
8	**Sex and Race**	U.S.P.H.S. Schedule
	1 - White male 2 - White female 3 - Negro male 4 - Negro female 5 - Other male 6 - Other female y - No information	
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	00 - Under 1 year 01 - One but less than two years old . . . 99 - Ninety-nine years or older yy - No information	
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	0 - Interviewed 1 - Died between Nov. 1, 1948 and time of scheduled interviewed in 1948-49 2 - Died during smog episode	
12	**Death Certificate**	General
	0 - Not obtained 1 - Obtained from Harrisburg 2 - Obtained from Donora 3 - Obtained in 1948	
13	**Year of Death**	Death certificate and 5 x 8 file card
	8 - 1949 9 - 1949 0 - 1950 . . . 6 - 1956 7 - 1957	

14 - 15 Month of Death — Death certificate and 5 x 8 file card

01 - January	07 - July
02 - February	08 - August
03 - March	09 - September
04 - April	10 - October
05 - May	11 - November
06 - June	12 - December

16 Place of Death — Death certificate and 5 x 8 file card

1 - Donora
2 - Charleroi-Monessen Hospital
3 - Monongahela Hospital
4 - Other Pennsylvania
5 - Out of State
y - Unknown

17 - 20 Cause of Death - Death certificate — Death certificate

4 digit cause of death code
YYYY - No death certificate

21 - 24 Cause of death - Interview report — Schedule and 5 x 8 file card

4 digit cause of death code
yyyy - Unknown cause

25 Smog affection — U.S.P.H.S. Schedule

0 - Not affected
1 - Mildly affected
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3 - Severely affected
y - Unknown

26 Age groups (1948)

1 - <6
2 - 6 - 19
3 - 20 - 34
4 - 35 - 49
5 - 50 - 64
6 - 65+

27 Date of Death - Summarized (Cols. 13-15)

1 - 10/48 - 10/49	5 - 11/52 - 10/53	
2 - 11/49 - 10/50	6 - 11/53 - 10/54	
3 - 11/50 - 10/51	7 - 11/54 - 10/55	
4 - 11/51 - 10/52	8 - 11/55 - 10/56	9 - 11/56 - 4/57

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28 **Cause of death broad groupings** Cols. 17-19

1 - Infective and Parasitic 001-138
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7 - Unknown

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1 - Yes
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30 **Heart Disease in 1948**

1 - Yes
0 - No

31 **Bronchitis in 1948**

1 - Yes
0 - No

32- 33 **1948 Age group**

01 - 06
02 - 6-12
03 - 13-19
04 - 20-24
05 - 25-29
06 - 30-34
07 - 35-39
08 - 40-44
09 - 45-49
10 - 50-54
11 - 55-59
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Heart Disease
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05 - With hypertension 440-443
06 - Other Heart disease 430-434
07 - Hypertension without h.d. 444-447
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15 - Pneumonia, influenza	480-493
16 - Tuberculosis	001-019
17 - Bronchitis	500-502
18 - All other causes	(residual)
yy - Cause unknown	

APPENDIX E

Summary of Steps Undertaken to Prepare Donora for the Health Study

The cooperation of the persons to be interviewed during the Donora Health Study was exceptional. Many factors are known to influence response rates on morbidity surveys, and among these the way in which a prospective respondent first learns about the plan and purpose of a study seems to be important.

Reproductions of letters, news releases, radio announcements and other communications concerning various aspects of the Donora Study are included in the following pages in the chronological order in which they appeared. A brief statement outlining the purpose has been included on each item reproduced to provide continuity.

Dr. Plesher, a former student in the Department of Biostatistics, Graduate School of Public Health, University of Pittsburgh and a resident and health worker in the Monongahela Valley where Donora is situated made the first inquiries in Donora concerning the Health Study.

June 20, 1956

Dr. Michael Plesher
R. D. #1
Monongahela, Pennsylvania

Dear Mike:

Only the other day I learned that you have undergone a major operation and have not yet fully recovered. This is to give you our best wishes for an early and permanent recovery.

It looks as if we are going to receive a contract from the Public Health Service to resurvey Donora. You told me that you had discussed this possible resurvey with some of the people there. When you feel well enough to call me or to write me, would you please let me know with whom in Donora you had discussed the matter. Sometime in the next two weeks I intend to go to Donora and I would thus follow-up on the contacts which you have made.

Our best to you.

Yours sincerely,

/s/ Antonio Ciocco

Antonio Ciocco
Head of the Department

AC:ef

Letter sent to the representative of
the only large industry in Donora.

August 27, 1956

Mr. L. F. McGlincy
Manager of Operations, Pittsburgh District
American Steel and Wire Company
525 William Penn Place
Pittsburgh, Pennsylvania

Dear Mr. McGlincy:

Recently the Department of Biostatistics in this School was approached by the U. S. Public Health Service concerning the possibility that under a contract with the Government our School would be willing to undertake a survey in Donora which would be aimed at determining the health status of the population, particularly of that group that was involved in the smog episode of 1948. The Public Health Service hopes to organize in Donora and in other communities throughout the country programs of study of the health of the population in order to understand better the relationship between health and atmospheric pollution. Our Department of Biostatistics has been asked to undertake the study in Donora first, perhaps later in other communities of this area, because of our general interest in population surveys on problems of health and disease.

We have been told by the representatives of the U. S. Public Health Service that in the 1948-49 survey which was conducted in Donora the American Steel and Wire Company lent its full cooperation. We are hoping to form a local advisory committee for the survey, with representatives from management, the union, and civic leaders. It would be appreciated if you would give me the name of your representative with whom we should make personal contact. If you, personally, would wish to know more about the nature and scope of the proposed survey my colleague, Dr. Antonio Ciocco, Head of the Department of Biostatistics, and I would be very glad to call on you at your convenience in the near future.

My telephone number if Mayflower 1-3500, Extensions 202 and 203.

Sincerely,

/s/ Thomas Parran

Thomas Parran, M.D.
Dean

TP:mes

U.F.Corsini - Works Superintendent, Donora

The following three articles appeared in the Monessen-Independent, the newspaper of a neighboring community, during the period when the groundwork for the Donora Health Study was being laid. They were brought to the attention of the Study Director for general information by a representative of the American Steel and Wire Company.

COPY

- 4 -

AMERICAN STEEL & WIRE
DIVISION
UNITED STATES STEEL CORPORATION

L. F. McGLINCY
MANAGER OF OPERATIONS
PITTSBURGH DISTRICT

525 WILLIAM PENN PLACE
PITTSBURGH 30, PA.

November 6, 1956

Doctor Donovan Thompson
Graduate School
Public Health
Municipal Hospital
Pittsburgh 13, Pennsylvania

Dear Doctor Thompson:

Attached are the three articles about which we had telephone conversation last week. They ran in the Monessen-Independent Monday, October 29, Tuesday, October 30 and Wednesday, October 31.

Very truly yours,

W. L. Corbett

W. L. Corbett
ASST. TO MGR. OF OPERATIONS

WLC:ck

Attachment

125

Smog Tragedy Struck Valley Eight Years Ago, Killing 20

(This is the first of a series of articles dealing with the "Donora Smog" and the problem of cleaner air.)

By R. MITCHELL STEEN, JR.

Monongahela Valley residents had a tragic weekend just eight years ago.

The morning of Oct. 28, 1948 started out normally enough with the entire district covered by a murky, yellowish fog. But this normaley soon turned out to be more than just another October fog like the others that had blanketed the Valley in years past.

It wasn't long before the effects of this "fog" began to be felt in abnormal ways.

Doctors in the Donora-Webster area began to get an unusual number of calls for treatment of respiratory complaints. Upon arrival at the homes of the stricken, doctors found them grasping for breath in the fumes that permeated the air.

Calls for oxygen to help the suffering became more and more [illegible]ent and hospitals in the area were crowded.

For four days the "fog" which had then become known as smog, continued. Through it all the industrial plants of the Valley continued to pour their smoke and fumes into an air which by then was as thick as soup.

Panic struck on Saturday, Nov. 1, when the announcement came that 20 persons had died in the Donora-Webster area and that many more were ill.

By the following day the entire world heard of the tragedy.

It wasn't until several days later, when the smog had lifted, that doctors and health authorities began taking stock of what had happened.

An accusing finger was immediately pointed at the Donora Zinc Works of the American Steel and Wire Co. as a major factor in causing the death smog.

For years Valley residents had been aware of the white, acrid smoke emitting from the Zinc Works. It had made the countryside around Donora and Webster a barren waste.

Civic officials in Donora immediately demanded action from federal and state officials, as well as from private firms and research groups.

One of the first steps was the closing of the Zinc Works, which shut down for several days until given permission by state officials to resume production.

But it wans't long before the economic pressure was felt and smog survivors feared possible unemployment.

Investigations of the smog had been started by several research groups, and the United Steelworkers (CIO) offered $10,000 to help find the cause of the death-smog and prevent its recurrence.

Public meetings were held and

See SMOG—Page 3

MONESSEN-INDEPENDENT

OCTOBER 29, 1956

Smog

From Page One

statements were tossed back and forth by civic and industrial groups.

The U. S. Steel Corp., parent firm of the Zinc Works, stated that the zinc-making process had not been changed in all the 30 years the plant had operated in Donora. However, it did agree to modify its operations.

Two private investigators, Philip Sadtler, a member of a Philadelphia chemical research firm, and Dr. Clarence Mills, air pollution expert from the University of Cincinnati, offered the strongest statements.

Sadtler, who was the first to release a report, laid the blame on the amount of fluorine gas in the atmosphere. Dr. Mills branded the atmosphere around Donora the "worst he had ever found."

However, after several stormy sessions, Donora borough council decided that the U. S. Public Health Service should be the Agency to make the investigation.

The Daily Independent continued to hammer away editorially at the air pollution issue until the demand for action was heard.

During the months of November and December smog victims continued to suffer from the aftereffects and on Dec. 24, the 21st victim, George Weisdack, died.

On Dec. 27, Dr. Mills published a report stating flatly that the Zinc Works was responsible and claiming that over 3,000 persons had been affected.

Tomorrow: The formation of The Webster Society for Better Living and the Public Health Service report.

Webster Residents Fight Back At Death-smog; Form Society

(Second in a series)

By **R. MITCHELL STEEN JR.**

A small band of Webster residents led the fight against the death-smog that struck the Donora-Webster area eight years ago this week.

An aggressive organization, the Webster Society for Better Living, headed by President Abe Celapino was formed in January, 1949, a few months after the smog had killed 20 persons in that area.

The Society was pointed in its charges that the Zinc Works of American Steel and Wire Division, U. S. Steel, was totally to blame for the deaths.

Civil damage actions were filed by individuals in the Donora and Webster areas against American Steel & Wire. The law firm of the late Charles J. Margiotti was retained.

The suits, claiming nearly $4,000,000 were filed following the release of a U. S. Public Health Service report which recommended a 10-point program to prevent recurrence of the death smog.

The PHS report blamed the disaster, which had then claimed the lives of 20 persons and made 5,910 ill, on a combination of fumes and smoke from many sources, concentrated by unusual weather conditions.

The 200-page report ruled out any one substance as the cause of the tragedy. However, it said the sulphur dioxide and its oxidation products, together with smoke and fog, are "considered significant contaminants."

Outlining its recommendations for prevention of another death smog, the report said a alert should be issued to the community when a weather "anti-cyclone" similar to that of October, 1948, approaches the eastern United States.

A warning to begin preventative measures should be issued when the following conditions occur simultaneously for one day:

1. When the tests show that temperatures in the Valley are lower than those of the upper air.

2. When winds in the Valley are less than five miles per hour and in the upper air less than 10.

3. Moderate to dense fog in the Valley continues some time past noon.

When those conditions occur, the report said, industries in the Donora area and nearby communities should begin to curtail production.

The report described the weather of the smog weekend as an extended "inversion." An inversion occurs when a layer of warm air settles over the ground, preventing the usual updrafts.

The Webster Society for Better Living, which was leading the

See SMOG—Page 2

MONESSEN-INDEPENDENT

OCTOBER 30, 1956

Smog

From Page One

fight against air pollution, was "satisfied" with the PHS report.

With a few exceptions, the Society accepted the report. Celapino expressed disappointment over omission of the damage to vegetation by polluted air.

The Society contended that the Zinc Works was responsible for the dearth of vegetation in Webster and parts of Donora near the plant.

"Only in Webster and Donora are the hillsides gutted and without vegetation," Celapino said. "Almost every town along the river has its share of industrial plants, but only Donora has a zinc works. And only in Donora and Webster is it almost impossible to find a blade of grass."

The suits were tried in U. S. Federal Court, Pittsburgh and in April, 1951 the claimants accepted compromise settlements totaling $250,000.

(Continued tomorrow)

Opinions Differ as to Whether Smog Conditions Have Improved

(Third in a series)

By R. MITCHELL [illegible] JR.

The two most articulate parties in the aftermath of the "smog" disaster that struck the Donora-Webster area eight years ago this week still differ as to whether conditions have been substantially improved.

Officials of the American Steel & Wire Division, U. S. Steel Corp., which operates the Zinc Works in Donora, contend that a similar tragedy could not recur.

But Abe Celapino, president of the Webster Society for Better Living, claims "another smog tragedy could occur tomorrow."

Both cited arguments to support their contentions.

Celapino claims "no basic improvements have been made in the Donora Zinc Works — obvious cause of the smog tragedy — other than to reduce operations."

American Steel & Wire told this writer that one factor alone would prevent a recurrence of the tragedy — that of the operation of a weather station at the Donora plant which it claims "has never indicated a return of the weather conditions that prevailed Oct. 28, 1948."

The weather station, the company claims, would immediately indicate a similar "inversion" that occurred that day. If the weather station found an "inversion" present, steps would be taken immediately to curtail production at the Zinc Works.

This didn't impress Celapino, who continued: "Unhappily air pollution hasn't been reduced in a proper ratio."

"We have proof," Celapino said, "to support that claim. But, by far our best argument is to invite interested persons to spend a day in Webster. The irritation, the stench, the unpleasantness caused by the Zinc Works is ample evidence that American Steel & Wire has not kept faith with its promise to correct the nuisance.".

Officials at American Steel & Wire claim that in addition to modifying production methods at the Zinc Works, other steps have been taken to correct the conditions which led up to the pollution of air in the Donora-Webster area.

These steps are:

1. Combustion conditions have been improved with coal burning equipment while steam requirements at the plant have been reduced.

2. Substitution of natural gas for coal to some extent.

3. Reduced operations in the

See SMOG—Page 3

Smog

From Page One

Zinc Works due to a change in the physical characteristics of ore suppiles. The Zinc Works is now operating five furnaces instead of the eight which were operating at the time of the "smog."

4. Operation of a weather station at the Zinc Works which will give a warning in case of similar conditions, thus giving the plant time to reduce operations.

5. Conversion to diesel power on the railroads, both on the Donosa Southern, which is operated by the American Steel & Wire, and on the Pennsylvania Railroad, which runs through Donora. River boats have also been converted to diesel power, which the company contends cuts down markedly on air pollution.

6. Community consciousness as to the causes of air pollution, thereby making residents of the area aware of the need for care in polluting the air.

7. The closing of the borough incinerator in Donora and the use of a sanitary fill in disposing of refuse.

8. Burning leaves is now prohibited.

9. The paving of streets and alleys in Donora, which the company contends cuts down on dust.

"Air pollution is everyone's problem," Harry C. Ballman, executive director, Air Pollution Control Association, said recently, "and we must do the things that will keep the public informed and active in the drive for cleaner air."

"Industry has spent many millions just to get partial improvement, and sometimes just to experiment. Much further research is needed not only to lick some of today's tough pollution problems, but because time and industrial expansion will bring new problems."

Manuel Campa, president of the United Steelworkers local at the Zinc Works, upon his return from the Steelworkers' convention at Los Angeles several weeks ago, said:

"Los Angeles has a bad case of smog. All of us had red, burning eyes and I for one, had to check in at a hospital. You couldn't take a good, deep breath.

"Sure makes me glad we cleaned up our problem at Donora. After that bad case, our zinc plant was shut down for study. The ore was changed. The company spent over a million dollars for a washer. Production was cut. Diesel engines came in.

"We in the Monongahela Valley cleaned up!"

MONESSEN-INDEPENDENT

OCTOBER 31, 1956

Letter of thanks sent to the manager of the Donora newspaper after he had met for the first time with the Director of the study and the study's Director of Public Information in the newspaper office in Donora.

January 16, 1957

Mr. George L. Higgins
Manager, The Herald-American
Meldon Avenue
Donora, Pennsylvania

Dear Mr. Higgins:

Dr. Thompson and I greatly appreciate the warm welcome and the help you gave us during our interview Monday. It was a pleasure to discuss the health survey with you.

I am sending you the article about the survey, which you read, and which will be the first official public announcement of the survey. According to your agreement, it will appear in The Herald-American on January 21.

We are today mailing to the leaders of Donora the letter you read, inviting them to the meeting on Wednesday, January 30, to hear about the survey. With this letter we are sending them an advance copy of the article which will appear in your paper this Monday.

If for any reason you wish to talk with Dr. Thompson, his number at the University is MAyflower 1-3500, Extension 782.

Again, please accept our sincere thanks for your cooperation.

Cordially yours,

/s/ Ida Sissman

Mrs. Ida Sissman
Director, Public Information

Sample of letter of invitation which was sent to each person on the list of leading Donora citizens which follows on a subsequent page.

January 17, 1957

Dear Mr. ____________________:

In Monday's issue of the Donora Herald-American there will appear a news story of great importance to the citizens of Donora. An advance copy of that story is enclosed for your information.

We are sending this information to you as one of the civic leaders of Donora, and we hope we may count on your help in conducting this survey.

There may be things about this project which will need explanation and clarification. We have therefore arranged a meeting of community leaders for Wednesday evening, January 30, at 7:30 P. M. in Borough Hall. At this meeting representatives of the University of Pittsburgh will describe the study.

You have been suggested to represent the Donora Chamber of Commerce. Please fill out the enclosed card and drop it in the mail to indicate that you plan to be there.

We shall be deeply grateful for your cooperation.

Sincerely,

/s/ Donovan J. Thompson

Donovan J. Thompson
Associate Professor
Director, Donora Health Survey

DJT/mcd

Encl.

This is the first newspaper release which was sent to the (Donora) Herald-American, the only newspaper to which releases about the survey were sent. It was published in the issue of Monday, January 21, 1957, as requested.

The Borough of Donora has been chosen by the Graduate School of Public Health of the University of Pittsburgh for a health study of its residents.

The announcement of the forthcoming study was made today by Burgess August Z. Chambon.

Mr. Chambon stated at the same time that on Wednesday evening, January 30, 1957, a meeting will be held in Borough Hall at which representatives of the University will describe the study to representatives of Donora's labor and management, church, civic, and professional groups.

Donora is the fourth community in Western Pennsylvania to be studied in the past few years. The City of Pittsburgh, the Arsenal Health District of Pittsburgh, and Butler County have preceded Donora in this series of health studies.

The facts obtained from Donora residents and those given by families in the three other Western Pennsylvania communities will be studied and will be compared with the findings in similar studies to be undertaken in different areas throughout the nation. The United States Public Health Service hopes in this way to get an up-to-date picture of the extent of illnesses in the various parts of the country, especially of chronic illnesses, such as arthritis and rheumatism, heart disease, diabetes, and lung ailments.

One fact in particular makes Donora one of the most favored places in the nation for a health study. It has already had one such study, in 1948.

Now it will be possible to compare the health story of a community in all its aspects as it is in 1957 with the previous story of 1948, and to find out in what ways the health of the community has improved in eight years. In very few places is there information available as there is in Donora to make such a comparison possible, and this fact is one of the principle reasons Donora was chosen for the study.

The present plans call for trained interviewers to visit every household in Donora in an effort to reach as many as possible of the persons who were interviewed in the 1948 study.

The interviewers will be directed by the School of Public Health. This School, organized in 1948 by Dr. Thomas Parran, is one of the new schools in the expanding health center of the University of Pittsburgh.

It is planned to begin the study sometime in February.

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COPY

THE HERALD-AMERICAN
AN INDEPENDENT NEWSPAPER—FOR PUBLIC SERVICE
VOLUME 56 NUMBER 195 DONORA, PENNSYLVANIA, MONDAY, JANUARY 21, 1957

WILL MAKE HEALTH STUDY HERE

Pitt Graduate School Will Interview Local Residents Next Month

Schedule Meeting of Borough Leaders To Hear Discussion of Study Jan. 30

The Borough of Donora has been chosen by the Graduate School of Public Health of the University of Pittsburgh for a health study of its residents next month.

The announcement of the forthcoming study today was made by Burgess August Z. Chambon.

Mr. Chambon stated at the same time that on Wednesday evening, January 30, a meeting will be held in the Borough Building at which representatives of the university will describe the study to local representatives of labor and management, church, civic, and professional groups.

Donora is the fourth community in Western Pennsylvania to be studied in the past few years.

The City of Pittsburgh, the Arsenal Health District of Pittsburgh, and Butler County have [illegible] Donora in this series [illegible] studies.

The facts obtained from Donora residents, and those given by families in the three other Western Pennsylvania communities, will be studied and compared with findings in similar studies to be undertaken in different areas throughout the nation.

The United States Public Health Service hopes in this way to get an up-to-date picture of the extent of illnesses in the various parts of the country, especially of chronic illnesses, such as arthritis and rheumatism, heart disease, diabetes, and lung ailments.

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The interviewers will be directed by the School of Public Health. This school, organized in 1948 by Dr. Thomas Parran, is one of the new schools in the expanding center of the University of Pittsburgh.

It is planned to begin the study sometime in February.

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A list of Donora's community leaders, representing labor and management, church, civic, and professional groups, who were invited to the initial meeting of Donora's citizens to discuss the health study - in the Borough Building, Wednesday, January 30, 1957.

This list was compiled after consultation with individuals who were known to have a thorough knowledge of Donora's leading men and women and the organizations in which they were active.

John P. Marasovich
President-Chamber of Commerce
601 Allen Avenue
Donora, Pennsylvania

Mrs. Alden F. Miller, Jr.
Secretary, Chamber of Commerce
Overlook Terrace
Donora, Pennsylvania

Wallace Hirsch
President, Merchants Division
Chamber of Commerce
Donora Furniture Company
Donora, Pennsylvania

Joseph J. Gibbons
Grand Knight K. of C.
513 Market Street
Donora, Pennsylvania

Dr. M. J. Hannigan
Country Club Road
Monongahela, Pennsylvania

August Z. Chambon, Burgess
211 McKean Avenue
Donora, Pennsylvania

Alfred Zeffiro, Transfer and Storage
677 Thompson Avenue
Donora, Pennsylvania

John J. Lorenzo, Barber
783 McKean Avenue
Donora, Pennsylvania

Andrew S. Sukel
Supt. of Schools
431 Waddell Avenue
Donora, Pennsylvania

George Higgins
Herald-American
Meldon Avenue
Donora, Pennsylvania

John K. Taylor
Pres. of School Board
200 Thompson Avenue
Donora, Pennsylvania

Edward F. Hall
Pres. Donora Teachers Assn.
428 Second Street
Donora, Pennsylvania

Frank S. Simchak
Health Officer
Rear 619 Second Street
Donora, Pennsylvania

Mrs. Emily Schall, President
Donora Advisory Board of P.T.A. Association
64 Kenric Avenue
Donora, Pennsylvania

Albert M. Pipik
Pres. Boro Council
526 Second Street
Donora, Pennsylvania

Thomas H. Garde, President
United Steelworkers of American
Local 3030
6th Street and McKean Avenue
Donora, Pennsylvania

Manuel Campa, President
United Steelworkers of American, Local 1757
654 Thompson Avenue
Donora, Pennsylvania

Victor Giannamore, President
United Steelworkers of America
Local 1758
Irondale Hotel
Donora, Pennsylvania

Walter A. Karol
President, Toastmasters Club
1312 Marelda Avenue
Donora, Pennsylvania

William C. Rank
President, Junior C. of C.
567 McKean Avenue
Donora, Pennsylvania

William C. Warnick
Exalted Ruler B.P.O.E. #1265
R. D. #2, Wickerham Drive
Monongahela, Pennsylvania

Robert W. Turnbull
President, Lions Club
49 Allen Avenue
Donora, Pennsylvania

Fred Ross
President, Rotary Club
135 Kenric Avenue
Donora, Pennsylvania

Mrs. Dorothy Boyd
President, Castner School P.T.A.
526 McKean Avenue
Donora, Pennsylvania

Mrs. Grace Pokol
President, 6th St. School P.T.A.
117 Castner Avenue
Donora, Pennsylvania

Mrs. Betty Kosanovich
President, Jr. High P.T.A.
434 Second Street
Donora, Pennsylvania

Mrs. Gloria Weiss
President, Allen School P.T.A.
100 Thompson Avenue
Donora, Pennsylvania

Mrs. John J. McCormick
President, St. Charles Mothers' Guild
77 Castner Avenue
Donora, Pennsylvania

Mrs. Mildred Urbanik
President, Parents and Teachers Guild
24 Gilmore Terrace
Donora, Pennsylvania

Miss Irene L. Hilaire
President, Forecast Club
95 Kneric Avenue
Donora, Pennsylvania

Mrs. Elton Polkabla
President, Donora Woman's Club
749 McKean Avenue
Donora, Pennsylvania

Rev. Benj. Krohn
616 Thompson Avenue
Donora, Pennsylvania

Monsignor Jos. A. Kushner
575 Thompson Avenue
Donora, Pennsylvania

Anton Policak
President, Croatian Club
Box 424 A, R. D. #1
Monongahela, Pennsylvania

Carl Mendarino
President, Sons of Italy
109 Isabel Street
Monongahela, Pennsylvania

Rev. L. F. Johnston
401 Prospect Avenue
Donora, Pennsylvania

Rev. John E. Washington
629 Fifth Street
Donora, Pennsylvania

Rev. Walter E. McBrayer (colored)
213 8th Street
Donora, Pennsylvania

Jas. M. Alexander
Master F. & A.M.
Box 153 Rte. 837
Fisher Heights
Monongahela, Pennsylvania

U. S. Corsini
General Supt.
1249 Country Club Road
Monongahela, Pennsylvania

H. E. Hornickle, General Supt.
Donora Zinc Works
120 Lincoln
Monongahela, Pennsylvania

Mrs. Julia Ponta, President
St. Dominics Woman's Club
411 Seventh Street
Donora, Pennsylvania

Mrs. Elizabeth Ostrander
Secretary, Board of Health
407 Thompson Avenue
Donora, Pennsylvania

Dr. Wm. Rongaus
Chairman, Board of Health
Donora, Pennsylvania

Mr. Tom Petrus
Borough Secretary
705 Allan Avenue
Donora, Pennsylvania

Mr. Edward Lelik, Council
204 5th Street
Donora, Pennsylvania

Mr. Arnold W. Hirsch, Council
534 McKean Avenue
Donora, Pennsylvania

Mr. Joseph Mouyard, Council
85 Castner Avenue
Donora, Pennsylvania

Albert P. Delsandro, Council
327 McKean Avenue
Donora, Pennsylvania

Elmer Hama, Commander, American Legion
427 Fifth Street
Donora, Pennsylvania

John Veliky, Catholic War Veterans
83 Highland Avenue
Crestview Plan
Donora, Pennsylvania

AGENDA

Meeting of community leaders to discuss the
Donora Health Study Borough Building,
Donora, Pennsylvania,
January 30, 1957

1. Introduction - Burgess August Z. Chambon

2. Background and plans - D. J. Thompson

   A. Introduction of the "University Group"

      Dr. Antonio Ciocco
      Dr. Harry Heimann
      Mrs. Ida Sissman
      Miss Dorothy Perrott

   B. History of the development of this study

      (1) School's interest in community studies on chronic disease prevalence and incidence. Stress lack of information.

      (2) Public Health Service interest - Dr. Heimann

   C. What we plan to do

      (1) Incidence - changes in health since first Public Health Service study in 1948-49.

         (a) Census of entire borough to begin the job of locating all persons in 1943-49 study.

         (b) When found, questions concerning changes in health will be asked.

      (2) Prevalence - present health status of all borough residents

         (a) Sample one-third of the households in Donora and ask questions about current health.

      (3) Eighteen interviewers have been hired for about five or six weeks.

   D. What we need from the group present

      (1) Support and advice as the study progresses.

3. Question and answer period - Dr. Heimann, Dr. Ciocco, and D. J. Thompson.

Second news release to The (Donora) Herald-American, which appeared in the issue of Thursday, January 31, 1957, as requested.

Consent of Mr. Zeffiro was secured before quoting him.

Last night a group of civic leaders of Donora met in the Borough Building to hear a discussion of the forthcoming health study to be made in the borough.

Speakers from the University of Pittsburgh's Graduate School of Public Health were Dr. Antonio Ciocco, head of the Department of Biostatistics and Dr. Donovan J. Thompson, associate professor in the department and director of the study.

Dr. Harry Heimann of the United States Public Health Service also spoke. The United States Public Health Service is providing the funds to the School of Public Health to conduct the study.

The study will be started about the middle of February, according to Dr. Thompson.

Every home in Donora will be visited by an interviewer especially trained for this study. Thus, it is planned, every person who participated in the study which was conducted in 1948-49 will be given an opportunity to answer questions about his health. From these facts will come information about how the health of the population has fared since the last study.

In addition, in every third household the adult persons will be asked questions about the present health of each member of the family. They will be asked about their acute illnesses, chronic illnesses, disabilities, etc. This information, along with that obtained from similar health studies made in communities throughout the country, will help the United States Public Health Service obtain facts upon which to base programs in health research, services, and education.

Those present at the meeting expressed enthusiastic approval of the study.

Mr. Alfred Zeffiro, prominent Donora citizen, said,

"In my opinion, Donora is fortunate in having been chosen for a health study. While we are not the first community in Western Pennsylvania to have such a study, our contribution can be unique in that we are one of very few communities which have had a previous health study as a basis for comparison. Not only do we, the citizens of Donora, stand to benefit by this, but we can also make a real contribution to the health of people everywhere."

very Home Will be Visited

Health Survey Will Start Here Feb. 11

A health survey of Donora residents will begin on Monday, Feb. 11, and will extend for about five weeks.

This was announced last night by Dr. Donvan J. Thompson, director of the survey and assistant rofessor of biostatistics at the University of Pittsburgh, School of Public Health, who spoke at a Borough Building meeting of 40 Donora civic leaders.

Dr. Thompson stated that very home in Donora will be visited, but information will be obtained only from every third household.

According to Dr. Thompson, each home will be visited so that every person who answered questions about his health during the 1948-49 survey conducted by the university will be given an opportunity to describe changes in his health since that time.

Emphasis of the survey will be placed on frequency of chronic diseases, but other illnesses will be tabulated, Dr. Thompson said.

Dr. Antonio Ciocco, head of the biostatistics department at Pitt, and Dr. Harry J. Heiman, of the U. S. Public Health Service, were also present at the meeting. The Public Health Service is providing funds for the university to conduct the survey here.

It was stated all information obtained will be confidential, as the purpose of the survey is to gather information about the health of the community as a whole, and not to consider individual health problems.

Dr. Thompson said 18 interviewers have been selected and will be trained by members of the survey staff, beginning next Monday.

According to the survey staff Donora residents are showing "an unusual amount of cooperation."

Previous community surveys, in addition to the 1948-49 study here, were held in Butler County and e Arsenal Health District of ittsburgh.

Alfred Zeffiro, prominent local

(Continued on Page Three)
(Column Two)

Health Survey

(Continued from Page One)

resident, declared, "In my estimation, Donora is fortunate in having been chosen for a health study. While we are not the first community in Western Pennsylvania to have such a study, our contribution can be unique in that we are one of very few communities which have had a previous health study as a basis for comparison.

"Not only do we, the citizens of Donora, stand to benefit by this, but we can also make a real contribution to the health of people everywhere," he added.

Third newspaper release, the quotations by clergymen used only after obtaining their consent. In the Herald-American issue of Monday, February 4, 1957.

Clergymen of all faiths in Donora have expressed their support of the health study to be started in Donora Monday, February 11, 1957.

In a message to his parishioners, Rt. Rev. Msgr. Joseph A. Kushner, Pastor of St. Dominic Church, invited them to cooperate in the study, to help determine the status of the health of the Donora people. He said he would encourage the members of his Church to do all they can to make the study a success.

Commenting on the study, the Reverend Russell W. Turner, Pastor of St. John's Episcopal Church and present of the Donora Ministerial Association, stated:

"We are happy to help the Graduate School of Public Health and the United States Public Health Service in their efforts to get information that eventually will lead to programs for better health. We urge the people of Donora to answer the questions when the interviewers visit them."

Rabbi Benjamin Krohn of the Congregation Ohav Sholom praised the study "as an opportunity for our residents to make a direct contribution to the community. The facts they give will be one of the guides to an understanding of the total health picture in the United States."

Representative Poll Here Shows Support

Churchmen Back Health Study

The clergymen of all faiths represented in Donora expressed their support of the health study to be undertaken here next Monday.

A poll of Catholic, Protestant and Hebrew leaders in the community indicated they are staunchly behind the health study, initiated by the Graduate School of Public Health of the University of Pittsburgh.

In a message to his parishioners, Rt. Rev. Msgr. Joseph A. Kushner, pastor of St. Dominic Church, invited them to cooperate in the study—to help determine the health status of local residents.

He said he would encourage members of his congregation to do all they can to help make the study a success.

Commenting on the study, Rev. Russell W. Turner, pastor of St. John's Episcopal Church and president of the Donora Ministerial Association, remarked:

"We are happy to help the Graduate School of Public Health and the United States Public Health Service in their efforts to get information that eventually will lead to programs for better health.

"We urge the people of Donora," Rev. Turner added, "To answer the questions when the interviewers visit them."

Rabbi Benjamin Krohn of the Congregation Ohav Shalom praised the study "as an opportunity for our residents to make a direct contribution to the community."

Rabbi Krohn pointed out, "The facts they give will be one of the guides to an understanding of the total health picture in the United States."

Pitt's Department of Biostatistics has lined up 18 interviewers from Donora, who will be trained this week, beginning with today, for their task of canvassing every local residency.

The survey which gets underway next Monday is expected to take five weeks to complete.

The reason for this letter becomes clear upon reading it. By a fortunate happening, the publicity director found it necessary to deliver the letter in person. At that time Mr. Triscik pointed out the need to secure the support of every priest in Donora. Each parish, he said, was made up largely of people of one national origin, some of whom did not understand English. Even if they did, many would not understand the purposes of the survey, even if explaine correctly. But they were likely to accept their priest's assurance of its value.

The subsequent visits by the publicity director to the priests resulted in their support, after they had questioned in detail about the study.

February 6, 1957

Dear Mr. Triscik:

Several days ago I spoke with Monsignor Kushner regarding the part your church might play in helping to publicize the Donora Health Survey.

Monsignor Kushner kindly gave me permission to use his name in the news article which you no doubt saw in The Herald-American on Monday, February 4, in which clergymen of Donora expressed approval of the study and invited parishioners to support it by answering the questions about their health.

When I asked Monsignor Kushner if we might look for further help from members of the parish, such as putting up a notice about the survey on the bulletin board, or having an article about it in your bulletin, or talking about it at your meetings, he told me he was going out of the city for some weeks and suggested that I get in touch with you.

I am enclosing two releases which give the basic information about the study. If you would be so kind as to take the time to spread the word in the ways I have suggested and in any way you think of, we would be very grateful indeed. To this date, the support of the citizens of Donora has been very encouraging.

The staff experts from the University of Pittsburgh's Graduate School of Public Health will be available in their office in the Donora Borough Building until the study is over. There is a phone there (I believe the number is 287), and if you wish any further information, Miss Perrott will be happy to give it to you.

Please accept our sincere thanks for your interest in the study and for the cooperation which your church, through Monsignor Kushner, has already given this important health project.

Sincerely,

/s/ Ida Sissman

(Mrs.) Ida Sissman
Director, Public Information

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This letter was prepared for
distribution by the president of
the Donora Ministerial Association
to each of the Protestant ministers
in the Borough.

February 7, 1957

A health survey of Donora residents began on Monday, February 11, and will extend for about five weeks.

The churches in Donora have been asked to help publicize this study, and of course we are very happy to do so.

The enclosed reprint from The Herald-American gives details about the study, - its purpose, who will be visited, why Donora was chosen, etc. It represents basic information which can be used to inform the members of our churches about the study, through bulletins, men's and women's clubs, and on bulletin boards.

Information regarding the study will continue to be carried in our newspaper and over the radio, on WESA.

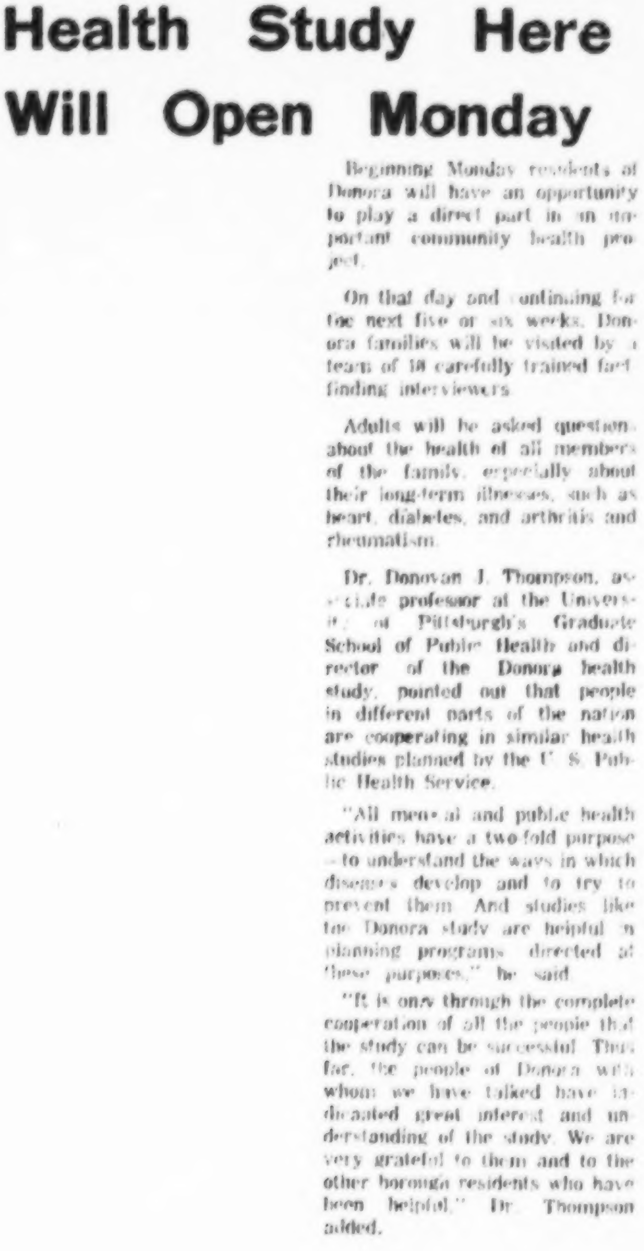
I am sure the part played by the churches will add greatly to the success of this important health project.

With kind personal regards.

Cordially yours,

President, Donora Ministerial
Association

Fourth news release to The (Donora) Herald-American, which appeared in the issue of Friday, February 8, 1957, as requested. The submitted copy was used without change.



Health Study Here Will Open Monday

Beginning Monday residents of Donora will have an opportunity to play a direct part in an important community health project.

On that day and continuing for the next five or six weeks, Donora families will be visited by a team of 18 carefully trained fact-finding interviewers.

Adults will be asked questions about the health of all members of the family, especially about their long-term illnesses, such as heart, diabetes, and arthritis and rheumatism.

Dr. Donovan J. Thompson, associate professor at the University of Pittsburgh's Graduate School of Public Health and director of the Donora health study, pointed out that people in different parts of the nation are cooperating in similar health studies planned by the U. S. Public Health Service.

"All medical and public health activities have a two-fold purpose – to understand the ways in which diseases develop and to try to prevent them. And studies like the Donora study are helpful in planning programs directed at these purposes," he said.

"It is only through the complete cooperation of all the people that the study can be successful. Thus far, the people of Donora with whom we have talked have indicated great interest and understanding of the study. We are very grateful to them and to the other borough residents who have been helpful," Dr. Thompson added.

DONORA PUBLIC SCHOOLS
Donora, Pennsylvania

February 8, 1957

Mr. Sukel, superintendent of Donora schools, was one of the leading citizens who attended the discussion meeting in the Borough Building several weeks before the suvey was begun.

He assumed the initiative in sending letters about the study to all parents. If he had not, this procedure would have been requested of him.

Dear Parent:

Some time after February 11, 1957 you will be contacted by an interviewer to give certain health information about yourself and your family.

These interviewers will be gathering information for the Donora Health Study conducted by the Graduate School of Public Health of the University of Pittsburgh in cooperation with the United States Public Health Service.

The purpose of this Study is to obtain an up-to-date picture of the extent of illnesses in Donora in 1957, especially of chronic illnesses, such as arthritis and rheumatism, heart disease, diabetes, and lung ailments. Information thus obtained will be studied by people in the Pitt Graduate School of Public Health, who are trained in this work, to see what the health situation is in Donora and to make recommendations accordingly.

Local people, who have been properly instructed by the Pitt Graduate School of Public Health representatives, will do the interviewing. They will visit every home in Donora. In some homes more questions will be asked than in others, depending upon the extent of illness since 1948.

Information obtained by interviewers will be kept strictly confidential. No one except the interviewer and the Pitt personnel will know what answers you have given to the questions.

Your cooperation in this Study is earnestly solicited. Please receive the interviewer cordially and give the information requested.

Let's make the Donora Health Study as thorough and as accurate as it can be!

Sincerely,

DONORA PUBLIC SCHOOLS

Andrew S. Sukel

Andrew S. Sukel
Superintendent of Schools

AS/ms

On the advice of Donora leaders, these radio spot announcements were submitted to and used by only one station, WESA the only station broadcasting from the Monongahela Valley.

They were broadcasted several times a day beginning a few days before the interviewing started and less frequently for several weeks during the interviewing period.

Spot Announcements
suggested for
Radio Station WESA
to tell about the
Donora Health Study

RESIDENTS OF DONORA,

If you were asked to do something to help yourself and your community to better health, you would be willing, wouldn't you?

Well, here is your chance!

In the health study of Donora's residents, beginning Monday, February 11, you may be called upon to answer questions about your health, especially about long-term illnesses, such as arthritis and rheumatism or diabetes.

The facts you give will help the U. S. Public Health Service get an up-to-date picture of the extent of illnesses in different parts of the country.

And the facts you give will help in the building of programs in health research, services, and education.

Spot Announcements

RESIDENTS OF DONORA,

Beginning Monday, February 11, this Monday, a trained interviewer may call on you to answer questions in the health study of Donora residents.

She will ask questions about your health, especially about chronic illnesses, such as arthritis and rheumatism and heart disease.

Won't you please coopeaate? In the cause of better health, for yourself, your neighbors, and your community?

Spot Announcements

RESIDENTS OF DONORA,

On Monday, February 11, a health study of Donora residents will begin. Won't you cooperate when a trained interviewer comes to your home, and answer the questions about your health?

This study in Donora is one of many studies being made all over the United States to find out about the health of the entire nation, especially about chronic illnesses, such as heart disease and diabetes.

Your answers and the answers that other people give will help the United States Public Health Service obtain facts upon which to base programs--in health research--services--and education.

Spot Announcements

RESIDENTS OF DONORA,

Your family may be one of the families called upon to answer questions in the health study beginning this Monday, February 11.

A trained interviewer will visit you and ask questions about your health, especially about chronic illnesses, such as arthritis and rheumatism. Won't you answer these questions?

One prominent Donora citizen has said,

"In my opinion, Donora is fortunate in having been chosen for a health study, the fourth community in Western Pennsylvania to have such a study... Not only do we, the citizens of Donora, stand to benefit by this, but we can also make a real contribution to the health of people everywhere."

COPY

ELIZABETH OSTRANDER, SECRETARY
407 THOMPSON AVE., DONORA, PA.

MEMBERS
DR. WILLIAM J. RONDAUS, PRESIDENT
JOSEPH VERDUCI, VICE PRESIDENT
CHESTER GLINKA
JOHN F. FISHER
STEPHEN J. BRCICH

DONORA BOROUGH
Board of Health
BOROUGH BUILDING
DONORA, PENNSYLVANIA

FRANK S. SIMCHAK, HEALTH OFFICER
P. O. BOX 725, DONORA, PA.

February 15, 1957

This letter from the Donora Board of Health and the Croatian Citizens Club are typical of the response engendered among many groups by the public information policies followed.

Dr. D. J. Thompson
Director, Donora Health Study
Graduate School of Public Health
University of Pittsburgh
Pittsburgh 13 Pa

Dear Doctor Thompson:

Thank you for your letter, I am sorry that I was unable to attend the January 30th, meeting, but please be assured of my personal interest in the Study and my desire to furnish any information you may request within my power to provide.

Sincerely yours

(Miss) Elisabeth Ostrander
Secretary
Donora Borough Board of Health

ELIZABETH OSTRANDER, SECRETARY
407 THOMPSON AVE., DONORA, PA.

MEMBERS
DR. WILLIAM J. RONDAUS, PRESIDENT
JOSEPH VERDUCI, VICE PRESIDENT
CHESTER GLINKA
JOHN F. FISHER
STEPHEN J. GRCICH

DONORA BOROUGH
Board of Health
BOROUGH BUILDING
DONORA, PENNSYLVANIA

FRANK S. SIMCHAK, HEALTH OFFICER
P. O. BOX 755, DONORA, PA.

February 15, 1957

Dr. D. J. Thompson
Director, Donora Health Study
Graduate School of Public Health
University of Pittsburgh
Pittsburgh 13 Pa

Dear Doctor Thompson:

At the regular bi-monthly meeting, the Donora Borough Board of Health, on February 5, 1957 the following resolution was recorded in the minutes:

> "the Board of Health of Donora Borough approves the Health Survey now under way by the Graduate School of Health, University of Pittsburgh in cooperation with the United State Public Health Service; expresses appreciation of the effort and the value of information which may be revealed concerning the health of the people of Donora that may govern future preventative measures to insure better health of people of all ages here and throughout the nation, particularly for the older individual. The board of health offers its full cooperation".

Very truly yours

Elizabeth Ostrander

Elizabeth Ostrander
Secretary
Donora Borough Board of Health

February 16, 1957

Mr. Donovan J. Thompson
Director, Donora Health Study
University of Pittsburgh
Pittsburgh 13, Pennsylvania

Dear Mr. Thompson:

In reply to your letter of February 13, 1957, I regret very much not being able to be present at your meeting of the Donora Health Study.

May I say for myself, and for the members of our Club, that we are very pleased in the interest shown Donora in this project. I have made it a point to inform our members to be co-operative with your health survey workers that will be calling on them.

Please feel free at any time to call upon me for any advice or counsel concerning your health study in Donora.

Sincerely yours,

Anton Pollock
Anton Pollock
President, Senior Citizens Club

News stories appearing in the Herald-American during the Course of the Survey, designed to maintain community interest in the study.

Pitt Survey Head Talks to Rotary At Meeting Here

Dr Donovan Thompson, of the University of Pittsburgh, spoke on the current Donora health survey at a meeting of the Donora Rotary Club held yesterday at the First Presbyterian Church.

Dr Thompson said the purpose of the survey is to ascertain the number and types of chronic diseases in the community and to discover changes in health of local residents since a previous survey here in 1949.

Fred Ross served as chairman of the meeting and E. E. Compton was program chairman.

The meeting was arranged by Dr M J Hannigan.

Edward Rank and Richard Sukel, high school guests, were introduced by Dr Michael J. Herk

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Now Question 1200 Former Donorans

Health Survey Winds Up Here

Eighteen interviewers today are expected to wind up their questioning of Donora residents for the University of Pittsburgh's health study here.

Dr D J Thompson of Pitt's Department of Biostatistics and director of the survey, reported Donorans have cooperated fully with the Graduate School of Public Health. The survey—expected to take five weeks to complete—actually took only about four weeks.

The second phase of the probe—questioning citizens who have moved away—will get underway immediately, Dr Thompson said. Questionnaires will be sent to 600 former Donorans now living all over the 48 states and many in foreign countries.

Only those, however, who were questioned concerning their general health in 1949 by the U. S. Public Health Service, will get the questionnaires. Dr Thompson said a Herald-American news announcement of the survey early last December will be attached to the questionnaire.

He reported letters will go to former residents now living as far away as West Germany, Spain and Italy, as well as several nations in South America.

Dr Thompson explained that, while the 18 interviewers have finished in Donora, they still have 600 persons to question. That number has moved from Donora since 1949 to nearby communities, Pittsburgh and Western Pennsylvania in general.

All will be contacted personally and asked to complete the questionnaire.

The director said the second community health survey here found every household visited but information obtained from only one in every three homes.

All information will be kept confidential, he stressed, as the purpose of the survey was to collect material on the health of the community as a whole—not on possible individual problems.

The federal Public Health Service provided the funds for the survey and requested Pitt's School of Public Health to undertake it here, as Pitt has in several other Western Pennsylvania communities.

C O P Y

At the completion of the field work letters were sent thanking the various individuals whose help had made the survey successful. This letter and the next are typical.

Office of the Dean

March 20, 1957

Mr. L. F. McGlincy
Manager of Operations, Pittsburgh District
American Steel and Wire Company
525 William Penn Place
Pittsburgh 19, Pennsylvania

Dear Mr. McGlincy:

The first phase of our health study in Donora will be completed this week. The Donora community has cooperated fully with us, with the result that we are well satisfied with the outcome of this first phase. Dr. Ciocco and Dr. Thompson of our Biostatistics Department, who are responsible for this study, credit much of the success of the survey to the advice and help given to them by Mr. W. L. Corbett and Dr. A. M. Edwards of your organization. We also appreciate the help of Dr. R. B. O'Connor, Medical Director, United States Steel Corporation, and of Dr. D. Brown and Dr. M. J. Hannigan from the Donora Works.

Would you kindly convey to these gentlemen our sincere appreciation for their valued aid, and accept our thanks for your own full cooperation.

The analysis phase of the Donora study may pose problems about which we may wish to consult with you again. We will keep you informed.

Sincerely yours,

(Sig.) Thomas Parran

Thomas Parran, M.D.
Dean

cc: Dr. D. Brown
Dr. A. Ciocco
Mr. W. L. Corbett
Dr. A. M. Edwards
Dr. M. J. Hannigan
Dr. R. B. O'Connor
Dr. D. Thompson

May 7, 1957

Mr. Thomas H. Garde, President
United Steelworkers of America
Local 3030
Sixth Street and McKean Avenue
Donora, Pennsylvania

Dear Mr. Garde:

On behalf of the Donora health study team I want to thank you for the help you gave us in making the study a success.

Leadership in the community, such as yours and that of the other union presidents, did much to create an interest in and, subsequently, a response to, the purposes of the study on the part of the people of Donora.

We are very grateful to you and to the members of your union for your support.

Sincerely yours,

Donovan J. Thompson
Director, Donora Health Study

DJT:mcd